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THE CENTRAL GREAT PLAINS EXPERIMENTAL WATERSHED

*A Summary Report of 30 Years
of Hydrologic Research*

Agricultural Research Service
United States Department of Agriculture



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THE CENTRAL GREAT PLAINS EXPERIMENTAL WATERSHED

A Summary Report of 30 Years of Hydrologic Research

INTRODUCTION

The Central Great Plains Experimental Watershed, near Hastings, Nebraska, was a project for conducting research on watershed hydrologic problems associated with agriculture. The project was established in 1937 and was terminated at the end of 1967.

The purpose of this document is to briefly review the objectives, background, and history of the project; to summarize or provide examples of the hydrologic and related data collected; to provide some understanding of the contributions to the art and science of hydrology made by the project; and to notify research workers in the hydrologic field of the availability of the detailed hydrologic data gathered at the project.

Acknowledgements

Many persons contributed to the planning and establishment of the Central Great Plains Experimental Watershed and to the collection, compilation, and analysis of the data. Those who served at the project for significant periods of time included John A. Allis, Ivan Bauer, Frank Dragoun, R. R. Drake (deceased), Ralph Gaebe, L. L. Kelly, Earl C. Meyers, Victor Mockus, and Warren Rice. Among those most recently responsible for overall supervision of the project were W. C. Ackermann, D. L. Brakensiek, L. M. Glymph, L. L. Kelly, Carl Miller (deceased), A. L. Sharp (deceased), and Austin Zingg (deceased).

Unlisted by name are several engineers who served less than a year or two at the project or in a supervisory role, many engineering aids, clerks, and typists, and the local farmers, all of whom were important contributors to the project. Also should be mentioned the more than a hundred men who, under the Works Progress Administration, did all of the early construction work on the project.

The Hydrograph Laboratory, through a contract with the University of Nebraska Statistical Laboratory, and assisted by Frank J. Dragoun, is responsible for getting the data digitized. The Hydrologic Data Laboratory is responsible for adapting the data for inclusion in the ARS hydrologic data bank and the compilation of the information in Appendix A. The preparation of the draft report was by contract with L. L. Kelly, under the general supervision of D. L. Brakensiek, and with the assistance of many individuals from the Agricultural Research Service and the Soil Conservation Service.

Background

The Hastings project was a unit in a comprehensive watershed hydrology research program planned in 1935 by the Division of Research of the Soil Conservation Service. The Soil Conservation Service (SCS) was then a new agency that had been established by Congress to provide Federal leadership and assistance to farmers and agricultural organizations in combatting soil erosion, reducing upstream flood damage, and promoting water conservation. The new agency had quickly recognized the need for research studies and hydrologic data for the design of the erosion control, flood abatement, and water conservation structures and programs it was helping to plan and install on agricultural lands in all areas of the country.

The plan^{1/} developed by the Section of Watershed and Hydrologic Studies of the Division of Research of SCS stated the broad objectives of the research studies to be:

- "(A) To determine the effect of land use and erosion control practices upon the conservation of water for crops and water supply and upon the control of floods.
- "(B) To determine the effects under (A) above for small and large areas and to trace variations in this effect from the smallest plot and lysimeters through a series of intermediate watersheds to the largest watershed on the project.
- "(C) To determine the rates and amounts of runoff for precipitation of different amounts and intensities for watersheds of different configuration, size, shape, soil, topography, cover, underground conditions, land use, and erosion control practices."

^{1/} "Provisional Working Plan for Watershed Studies Relating to Water Conservation, Flood Control, and Runoff as Influenced by Land Use and Methods of Erosion Control to be Carried on in Typical Agricultural Regions of the United States" by C. E. Ramser and D. B. Krimgold, respectively Head and Assistant to the Head, Section of Watershed and Hydrologic Studies, undated mimeographed report (probably early 1935).

Ten experimental watersheds, each of which was to be representative of a typical agricultural region, were envisioned by the planners. Work on the first of the projects, the North Appalachian Experimental Watershed near Coshocton, Ohio, was started in 1935; and on the second, the Blacklands Experimental Watershed near Waco and Riesel, Texas, in 1936. Work on the third of the watershed research projects, the Central Great Plains Experimental Watershed, was started in 1937.

After the Hastings project, no more projects were initiated under this ambitious plan. Appropriations for the research were not as generous as had been hoped for; support of the Works Progress Administration, which had been the source of most of the labor for construction was being cut back; and perhaps the costs of the projects for both construction and operation were more than had been anticipated. The Hastings project was understaffed throughout most of its life. Beginning with the World War II period, no more than two professional people, at any one time, were ever employed at the project. The Provisional Working Plan had specified ten professional people supported by a dozen subprofessional and clerical people for each of the projects.

Close cooperation of the other subdivisions of the SCS was to be sought, as was cooperation with other Federal Bureaus. The traditional cooperative relationships between the U.S. Department of Agriculture research organizations and the State Agricultural Experiment Stations were to be continued. This cooperation between the people of the Nebraska Agricultural Experiment Station and those of the Hastings project was very close and fruitful, both in the establishment and operation of the project.

In 1954 the research on watershed hydrology was transferred from the SCS to the Agricultural Research Service (ARS). Positive steps were taken to assure the continued contact of the ARS research people and SCS operations. A procedure for presentation of SCS research "needs" to the ARS was developed and workshops were regularly scheduled for ARS to present and discuss research findings with SCS. The research needs of SCS thus continued to be a major influence on the direction of watershed research.

Selection of the Project Location

The Central Great Plains agricultural region, within which a watershed research project was to be located, comprised roughly the western two thirds of each of the states of Nebraska and Kansas, southeastern Wyoming, eastern Colorado, northeastern New Mexico, and the panhandles of Texas and Oklahoma. The watershed area selected for study within this area of over 200,000 square miles was to be representative of the region with respect to: 1) nature and extent of erosion, 2) general soil type, 3) predominating land use practices, 4) type of topography, and 5) geology as related to ground water condition.

The problem of selecting a suitable study area within the Central Great Plains followed a pattern outlined by Krimgold^{1/}. It was resolved into, first: determining for the region 1) the most prevalent type of erosion, 2) the major soil type, 3) the prevailing land use and farming practices, 4) the most prevalent type of topography, and 5) the major geologic formation. And second: eliminating from consideration the areas not typical with respect to each of the above factors, thus hopefully arriving at a small area or areas within the region which would be most typical of all areas.

The personnel assembled many maps and pages of statistics depicting various portions of the area and presenting various aspects of the above factors. The following listing shows the typical or prevalent characteristics determined for the several factors:

1. Most prevalent type of erosion: moderate or severe sheet erosion with occasional or frequent gullies.
2. Major soil type: Colby soil series of the Chernozem Great Soil Province.
3. Prevailing land use and farming practices: wheat-corn belt or corn and wheat transition belt.
4. Topography: undulating topography of the High Plains.
5. Major geologic formation: Ogallala and Arikaree formations.

^{1/} "Selection of an Experimental Watershed for the North Appalachian Region" by D. B. Krimgold. Undated mimeographed report (probably mid - 1935).

Regional maps of each of the five factors were constructed on a common scale and the "non-typical" areas were blocked out, leaving the typical areas as blank areas. When the five maps were laid, one over the other, certain residual blank areas remained and in each of these residual areas the five factors were all "typical".

The watershed research project was to be selected within one of the residual areas, the exact determination to be made by on-the-ground reconnaissance of the several areas and consideration of access, prospects of local cooperation, and other local factors. Though the above discussion is a somewhat over-simplified description of a very detailed study, it fairly represents the procedure followed. The experimental watershed, Beaver Creek, a tributary of the Republican River, was selected near the boundary of the largest residual area developed on the series of maps.

PROGRAM OF THE STATION

The general research approach for development of useful information for the hydrologic design of water control structures and watershed programs envisioned:

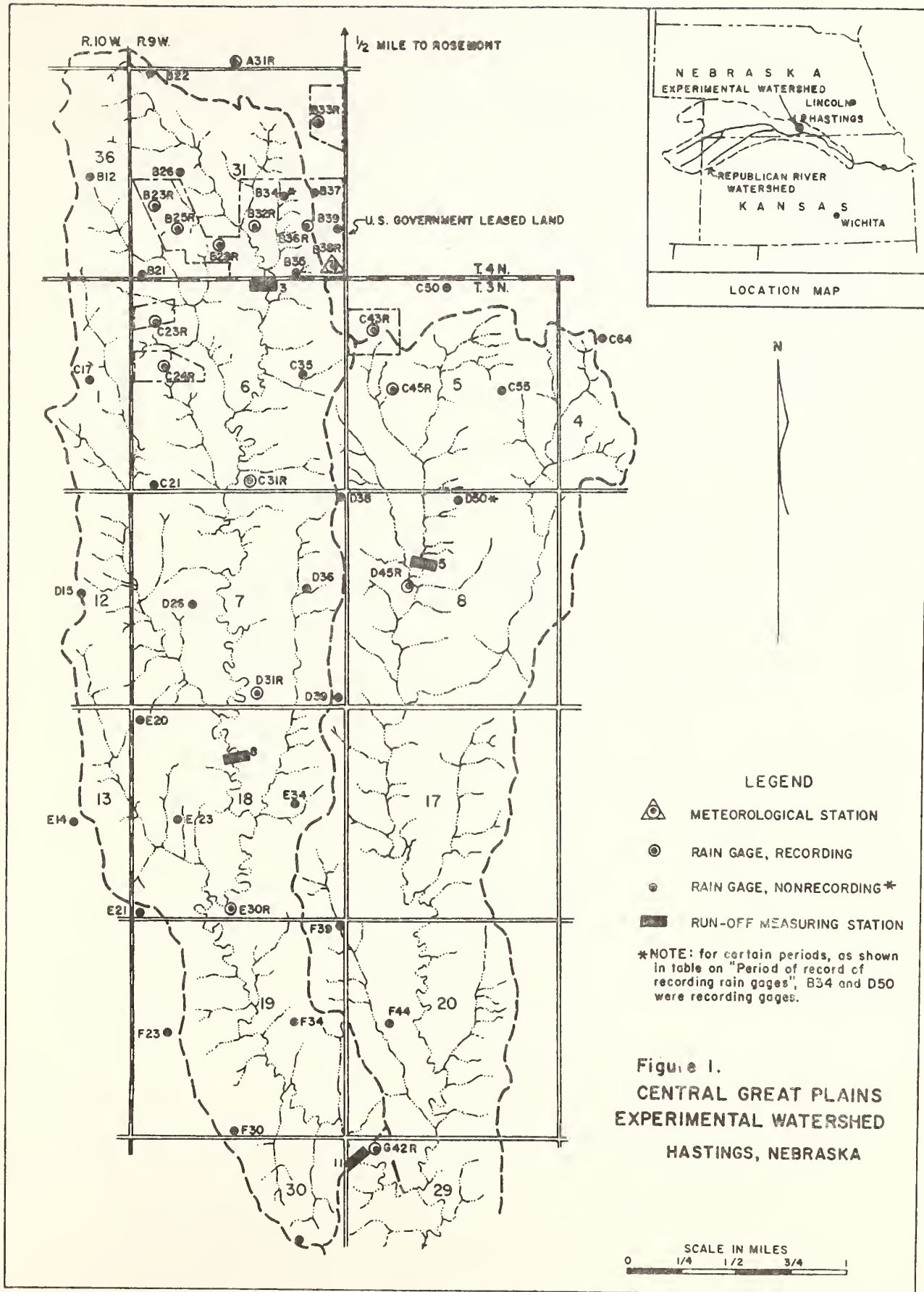
- 1) the instrumentation of several small single-soil single-crop watersheds where the effect of crop and treatment on runoff could be studied,
- 2) the instrumentation of several mixed-cover watersheds of one to ten square miles in area where the various relationships of watershed size to runoff could be examined, and
- 3) the instrumentation of two mixed-cover watersheds, one farmed with prevailing practices, the other with conservation practices, to compare the hydrologic effect of conservation treatment vs. the prevailing practice culture.

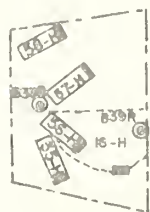
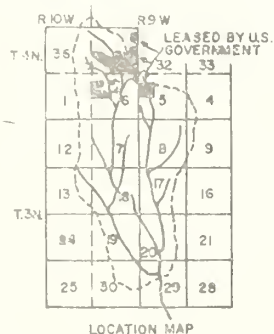
Though the serious erosion and sedimentation problems of the area were recognized at the time of the initiation of the program, sediment studies were not started until the late 1950's.

The small watershed studies required control of the land so that the required rotations and treatments could be applied. Several blocks of land were therefore leased, as shown in figure 1. The location of the 25 small watersheds and pasture plots is shown in more detail in figure 2.

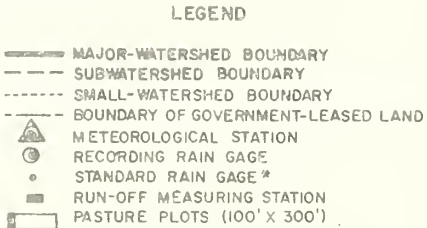
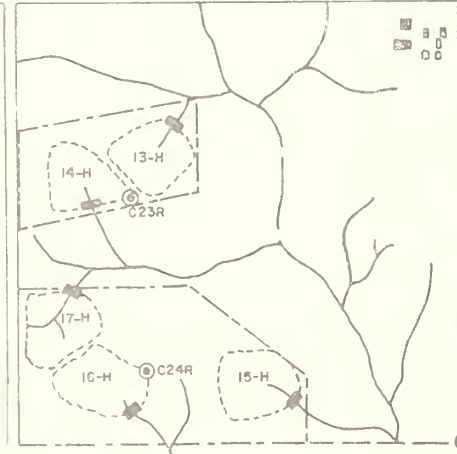
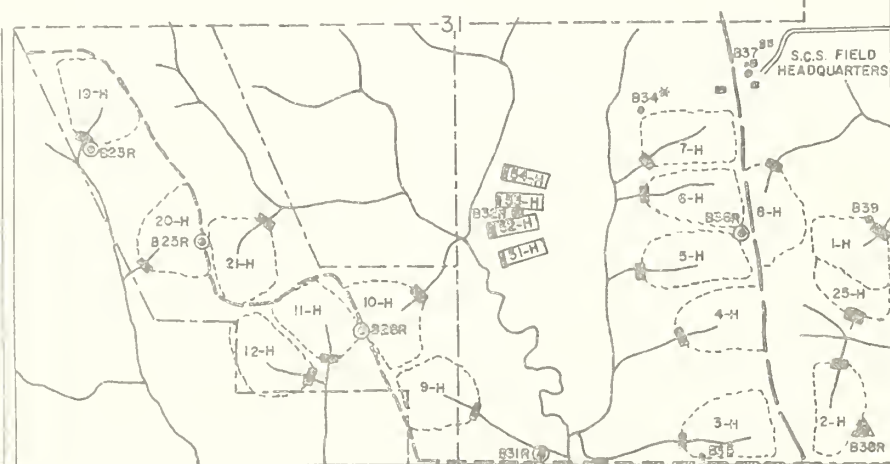
Watersheds W-3, W-8, and W-11, as shown in figure 1, were planned and instrumented to study the various relationships of size of watersheds to runoff.

To provide for the comparison of a conservation treated mixed-cover watershed, Watershed W-5 was instrumented; the plan was to apply conservation practices to this watershed and compare its hydrologic performance with that of Watershed W-3, which was to remain in prevailing practice.





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*NOTE: B34 was made a recording rain gage during the latter period of record.

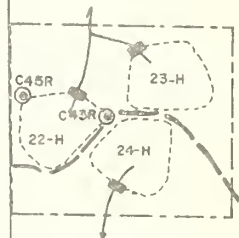


Figure 2. Small watersheds and pasture plots of the Central Great Plains Experimental Watersheds.

Small Watershed Studies

The small watershed studies at the Hastings project were concerned with runoff and related measurements from watersheds of about four acres in area. In this physiographic area, drainage areas of smaller size would have required substantial dikes at the lower end to cause the surface runoff to concentrate; and some drainage areas of larger size would have had encised channels which would not have been crossable by farm machinery.

Over the life of the project, 25 small watersheds were instrumented for the purpose of carrying out the planned experiments. The watersheds were numbered 1-H through 25-H, the "H" referring to the "H" flumes used for runoff measurement. The locations of the watersheds are shown in figure 2.

Small dikes, about six inches high, were constructed around the watersheds on the natural divide so as to delineate the watershed area precisely. At the lower end where the runoff entered the flume, the dikes were larger, of course.

The general objectives of the studies at the outset were, as listed in the first experimental outline:

- (a) to compare the effects of straight row, contour, and strip cropping cultures on the runoff from inter-tilled and small-grain crops, and
- (b) to compare the runoff from native meadow and untreated pasture land with that from cultivated land.

These were considered reasonable objectives at the time. One of the slogans of conservationists, then, was, "Stop the water where it falls", and there were substantial differences of opinion among both technical and lay people on the effectiveness of conservation measures on reducing runoff. An acceptable research answer at that time was a simple comparison of runoff from a conservation treated area versus a prevailing practice area. The answer would have been especially acceptable to many if it had developed that the conservation watersheds produced substantially less runoff than the prevailing practice watersheds.

Though the comparison of treatments remained as a kind of central thread throughout the life of the project, a different emphasis developed after World War II when the Soil Conservation Service became heavily involved in flood abatement programs in upstream areas. A later research outline listed the objectives concerned with the small watersheds to be, "to establish the effect of different land use treatment, different crops, and slope on the runoff and sediment yield from single-soil and single-crop watersheds in the Central Great Plains, as one of the significant factors influencing runoff and sediment yield from complex watersheds." Much of the thought and analysis was redirected toward developing methodology for use of the small watershed data in synthesizing flows from larger (complex) mixed-soil and mixed-cover watersheds and to understanding the reasons for differences in hydrologic performance of the various watersheds.

The small watershed studies may be divided into three time periods, based on the crop and treatments being studied: the period of 1939 through 1945, the period of 1946 through 1954, and the period of 1958 through 1967. A discussion of each follows.

Period of 1939 through 1945

The record of crops and treatments on the small watersheds for the period of 1939 through 1945 is set out in table 1. The original plan was to have duplicate watersheds in continuous native meadow; a single watershed in native pasture; and duplicate cultivated watersheds in a rotation of corn, oats, and wheat with two practices, contour tillage and straight row tillage. Also there were to be triplicate watersheds in contour strip crops of oats and corn. The type of tillage on the rotation watersheds was to be alternated, i.e. the first year the tillage would be on the contour, the next year the tillage would be in straight rows, and so on.

Table 1.—Crop and treatment plan for 4-acre watersheds for the period of 1939 through 1945

Crop and treatment by years <u>1/</u>							
Watershed	1939	1940	1941	1942	1943	1944	1945
1-H	Mn	Mn	Mn	Mn	Mn	Mn	Mn
2-H	Mn	Mn	Mn	Mn	Mn	Mn	Mn
18-H	P	P	P	P	P	P	P
5-H	COsc	COsc	Cc	Os	Wc	Cc	Oc
13-H	COsc	COsc	Cc	Os	Wc	Cc	Oc
3-H	COsc	COsc	Cs	Oc	Ws	Cs	Os
16-H	Oc	Ws	COsc	COsc	Ws	Cs	Os
6-H	Oc	Ws	COsc	COsc	Oc	Wc	Cc
7-H	Os	Wc	COsc	COsc	Oc	Wc	Cc
11-H	Os	Wc	Cs	Oc	COsc	COsc	Om
10-H	Cc	Os	Wc	Cs	COsc	COsc	Cm
14-H	Cc	Os	Wc	Cs	COsc	COsc	Om
9-H	Cs	Oc	Ws	Cc	Os	Ws	Cs
15-H	Cs	Oc	Ws	Cc	Os	Ws	Cs
4-H	Cc	Cs	Oc	Ws	Cc	Oc	Wc
12-H	Oc	Cs	Oc	Ws	Cc	Oc	Wc
8-H	Cs	Cc	Os	Wc	Cs	Os	Ws
17-H	Os	Cc	Os	Wc	Cs	Os	Ws
19-H			F	Wm	Cm	Om	Wm
24-H			W	Wm	Cm	Om	Wm
20-H			O	Cm	Om	Wm	Cm
23-H			W	Cm	Om	Wm	Cm
21-H			Cm	Om	Wm	Cm	Om
22-H			W	Om	Wm	Cm	Om

1/ Symbols used in columns are: Mn = native meadow; P = native pasture; C = corn; O = oats; W = wheat; F = summer fallow; sc = strip crop; o = contour farmed; s = straight row farmed; m = stubble mulch farmed.

The straight rows in this period (and all other periods) were in the same direction that they were in the original fields. Usually this was in the direction of the largest dimension of the field. As a consequence, the upper parts of some watersheds were quite close to being on the contour when they were straight row farmed. The contour strips of corn and oats were alternated; the first year a strip would be in corn and the next year in oats, or vice versa.

The annual alternation of contour cultivation with straight row farming, which had been strongly recommended by the organization's statisticians, did not work out in practice. It became apparent in the first several years of record that the carry over of moisture from the contour cultivation year to the straight row year, further complicated by the quite different growing seasons of the crops, had the effect of cancelling any runoff difference between treatments. Though differences in runoff from the different crops and treatments in certain seasons could be shown, it was clear that the answer being obtained was not the answer to the question intended. It will be noted in table 1 that beginning in 1943 the annual alternation of the practices was abandoned; thereafter in this period the plan was to maintain the watershed in the practice, either straight row or contour farmed, for a full cycle of the rotation.

Near the beginning of this period, the studies of stubble mulch tillage by Dr. F. L. Duley and J. C. Russell at Lincoln, Nebraska had indicated that this type of culture might be an effective means of decreasing runoff and conserving soil moisture. The objective of stubble mulch tillage was to leave as much of the crop aftermath on the soil surface as possible to break the impact of the rain which caused the sealing of the soil surface and reduced infiltration rate. The mulch also served to inhibit evaporation from the soil surface.

Duley's and Russell's work had been done largely on small hand tilled plots. A larger scale test of the practice was needed and therefore six additional watersheds, 19-H to 24-H inclusive were instrumented in 1942, with rotations and treatments as shown in table 1.

Near the end of this period it became increasingly clear that contour strip cropping was not a practicable conservation practice in this climatic and physiographic region because of the "border effect." The borders of fields in this region suffer substantial damage from the hot, dry winds and invasions of grasshoppers and other pests. In unfavorable years the damage often extends several yards into the field. In strip cropping a much greater length of field border is exposed to the hot winds and insects and thus more damage is suffered. It was concluded in 1944 that the studies of strip cropping should be discontinued.

With the several problems that had occurred, the cropping and treatment plan for the cultivated watersheds, 3-H to 17-H inclusive, was somewhat out of order by 1945 and it was apparent that a new cropping and treatment plan needed to be developed.

Period of 1946 through 1954

The crop and treatment plan for the 24 small watersheds for the 1946 through 1954 period is shown in table 2. It will be noted that a discrepancy exists in the treatment for two watersheds in the first year, 1946; the crop and treatment on watershed 7-H should have been oats-contoured rather than oats in straight rows and on 15-H, the crop and treatment should have been oats in straight rows rather than oats on the contour.

The two meadow watersheds and the pasture watershed were continued in operation during this period.

The plan was continued for nine years through three full cycles of the corn-oats-wheat rotation.

There were now 15 years of data on the watersheds. During the years of World War II and thereafter, the project had operated on budgets barely sufficient to collect and partially process the key data. It was now determined that priority would be placed on processing and analyzing the data and publishing of the research results. The records on all of the small watersheds except 1-, 2-, 5-, 6-, and 7-H were terminated at the end of 1954. And in 1957 the records on 5-, 6-, and 7-H were terminated.

Table 2 .--Crop and treatment plan for 4-acre watersheds for the period of 1946 through 1954

Crop and treatment by years ^{1/}									
Watershed	1946	1947	1948	1949	1950	1951	1952	1953	1954
1-H	Mn	Mn	Mn	Mn	Mn	Mn	Mn	Mn	Mn
2-H	Mn	Mn	Mn	Mn	Mn	Mn	Mn	Mn	Mn
18-H	P	P	P	P	P	P	P	P	P
8-H	Cc	Oc	Wc	Cc	Oc	Wc	Cc	Oc	Wc
17-H	Cc	Oc	Wc	Cc	Oc	Wc	Cc	Oc	Wc
7-H	Os	Wc	Cc	Oc	Wc	Cc	Oc	Wc	Cc
9-H	Oc	Wc	Cc	Oc	Wc	Cc	Oc	Wc	Cc
5-H	Ws	Cc	Oc	Wc	Cc	Oc	Wc	Cc	Oc
13-H	Ws	Cc	Oc	Wc	Cc	Oc	Wc	Cc	Oc
4-H	Cs	Os	Ws	Cs	Os	Ws	Cs	Os	Ws
12-H	Cs	Os	Ws	Cs	Os	Ws	Cs	Os	Ws
6-H	Os	Ws	Cs	Os	Ws	Cs	Os	Ws	Cs
15-H	Oc	Ws	Cs	Os	Ws	Cs	Os	Ws	Cs
3-H	Wc	Cs	Os	Ws	Cs	Os	Ws	Cs	Os
16-H	Wc	Cs	Os	Ws	Cs	Os	Ws	Cs	Os
11-H	Cm	Om	Wm	Cm	Om	Wm	Cm	Om	Wm
19-H	Cm	Om	Wm	Cm	Om	Wm	Cm	Om	Wm
24-H	Cm	Om	Wm	Cm	Om	Wm	Cm	Om	Wm
10-H	Om	Wm	Cm	Om	Wm	Cm	Om	Wm	Cm
20-H	Om	Wm	Cm	Om	Wm	Cm	Om	Wm	Cm
23-H	Om	Wm	Cm	Om	Wm	Cm	Om	Wm	Cm
14-H	Wm	Cm	Om	Wm	Cm	Om	Wm	Cm	Om
21-H	Wm	Cm	Om	Wm	Cm	Om	Wm	Cm	Om
22-H	Wm	Cm	Om	Wm	Cm	Om	Wm	Cm	Om

^{1/} Symbols used in columns are: Mn = native meadow; P = native pasture; C = corn; O = oats; W = wheat; c = contour farmed; s = straight row farmed; m = stubble mulch farmed.

Period of 1958 through 1967

During the period of 1958 through 1967, the small watershed studies were concerned with the hydrologic effects of two cultural practices: 1) an improved system of stubble mulch tillage and 2) restoration of cultivated land to native grasses.

The hydrologic evaluation of the improved stubble mulch tillage system was carried out on six small watersheds, 3-H through 8-H, as shown in table 3. In the improved system a fallow, wheat, sorghum rotation was followed; sorghum was replacing corn as a major cash and feed crop of the area. Fertilizer and lime were used to promote maximum production of residues and tillage was sufficient only to control weeds and maintain tilth.

Various government programs had the objective of taking cultivated land out of production and restoring it to stands of native grass as a means of reducing grain supplies. Also there were continuing programs to restore lands subject to severe erosion to grass land. First steps toward the evaluation of the hydrologic effects of such land use changes were taken during this period. Watersheds 1-H, 2-H, 18-H, 22-H, 23-H, and 25-H were used for the study as shown in table 3.

Watersheds 22-H and 23-H, lands of which had been cultivated for many years, were seeded with a mixture of native grasses similar to those in existing meadows. Watershed 25-H, a native meadow area, was instrumented. Watershed 1-H, another native meadow watershed, was plowed and a sorghum, fallow, wheat rotation followed. Watershed 2-H was pastured. Watersheds 1-H, 2-H, and 25-H were believed never to have been plowed. The experiment had to be abandoned prematurely at the end of 1967 when the Hastings project was terminated.

Table 3 .—Crop and treatment plan for 4-acre watersheds for the period of 1958 through 1967

Crop and treatment by years <u>1/</u>										
Watershed	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
1-H	Mn	Mn	Mn	Mn	Mn	Mn	Sf	Sm	Fm	Wm
2-H	Mn	Mn	Mn	Mn	Mn	Mn	P	P	P	P
22-H					Mr	Mr	Mr	Mr	Mr	Mr
23-H					Mr	Mr	Mr	Mr	Mr	Mr
25-H						Mn	Mn	Mn	Mn	Mn
18-H	P	P	P	P	P	P	P	P	P	P
3-H	Wm	Sm	Fm	Wm	Sm	Fm	Wm	Sm	Fm	Wm
8-H	Wm	Sm	Fm	Wm	Sm	Fm	Wm	Sm	Fm	Wm
4-H	Sm	Fm	Wm	Sm	Fm	Wm	Sm	Fm	Wm	Sm
7-H	Sm	Fm	Wm	Sm	Fm	Wm	Sm	Fm	Wm	Sm
5-H	Fm	Wm	Sm	Fm	Wm	Sm	Fm	Wm	Sm	Fm
6-H	Fm	Wm	Sm	Fm	Wm	Sm	Fm	Wm	Sm	Fm

1/ Symbols used in columns are: Mn = native meadow; Mr = meadow of reseeded native grasses; Sf = forage sorghum; S = sorghum in rows for grain; W = wheat; F = fallow; P = native pasture; m = stubble mulch farmed.

Characteristics of Runoff from Agricultural Areas of Different Sizes

Studies of runoff from larger areas were carried out on four watersheds: W-3 (481 acres), W-8 (2086 acres), and W-11 (3490 acres) all on the west branch of Beaver Creek, and W-5 (411 acres), on the east branch of the same creek.

The objective of this investigation was, as stated in the first work plan: "To study the characteristics of flood runoff from watersheds of various sizes and the factors affecting them under

- (a) Prevailing land use practices
- (b) Conservation practices.

"The flood characteristics to be investigated are the amount, peak rate, duration and frequency of flood runoff. The factors affecting these characteristics are: size and shape of watershed; slope of land surface; soil—character and condition; vegetal cover—kind, density, and condition; surface retention; drainage pattern—length, gradients, and location of streams; precipitation—amount, intensity, duration, and distribution."

The work plan (now called an experimental outline) was re-written in 1959 and the objectives became somewhat broader and more specific. The objectives listed were to be:

- "1. To compare peak rates, yields, and hydrographs of surface flow from two similar watersheds of approximately 400 acres under (a) prevailing land use practices and (b) conservation practices.
- "2. To measure instantaneous rates of surface flow at four gaging stations on the project; two in the 400-500 acre size, one in the 2000 acre size, and one in the 3500 acre size, and to use other available data as a basis for predicting peak rates, and hourly, daily, seasonal, and annual amounts of runoff from ungaged complex agricultural watersheds in this specific area.
- "3. To develop procedures to construct hydrographs for complex watersheds based on rainfall amounts and intensities, land use, crop conditions, soil moisture, etc.
- "4. To determine the magnitude of transmission losses in stream channels and valleys."

The general plan, when the project was initiated, was that all of the watersheds would be farmed under prevailing practices for several years to assess any inherent hydrological differences and that after such differences, if any, had been assessed, that conservation practices would be established on the W-5 watershed. This general plan was followed. The determination was made in 1946 that there were no significant differences in the runoff potentials of watersheds W-3 and W-5 and steps were taken to establish conservation practices on the lands of W-5. The Webster County Soil Conservation District provided technical assistance in determining the various conservation works and measures to be established. The key elements of the conservation plan developed were the establishment of grassed waterways for control of gullies and for terrace outlets, the construction of terraces on the lands remaining in cultivation, and the establishment of grasses on lands unsuitable for cultivation.

Though agreements for the establishment of a conservation plan were obtained from all land owners in the watershed (W-5) in 1946, some of the land in the upper part of the watershed changed ownership in 1947. The new owner did not continue the agreement and the 80 acres of land remained in the prevailing practice throughout the study.

The comparison of watersheds W-5 and W-3 was discontinued in December 1964 because of the construction of detention reservoirs in the W-5 watershed.

Pasture Treatment Studies

The objectives of the pasture treatment investigations were, as set out in the work plan, to "determine the effect of relatively heavy versus moderate grazing on runoff and also the effect of contour furrows under both moderate and heavy grazing." When these objectives were considered to have been accomplished at the end of 1945, the plan was revised to investigate the hydrologic effects of more closely spaced contour furrows and of treating the surface of the land with an "eccentric disk."

The eight pasture plots, shown in figure 2, were established in 1939. The plots were delineated at the top and sides and at the lower end by dikes to direct the runoff to 2-foot H flumes.

The treatments on the plots were as follows:

Plot	Grazing intensity	Mechanical practice	
		<u>1939-1945</u>	<u>1947-1954</u>
51-H	heavy	none	none
56-H	heavy	none	none
52-H	heavy	furrowed	added furrows
58-H	heavy	furrowed	furrowed
54-H	moderate	none	eccentric disk
57-H	moderate	none	eccentric disk
53-H	moderate	furrowed	furrowed
55-H	moderate	furrowed	added furrows

It will be noted from figure 2 and the above tabulation that the experimental plan provided that one set of the duplicated treatments would be in each of the pasture locations.

The pasture plots were located in heavily grazed pastures, and moderate grazing on the appropriate plots was accomplished by exclusion of livestock by fencing. The heavy grazing usually resulted in a grass height of one inch or less; the aim of the moderate grazing practice was to maintain the grass at about a three inch height.

The furrows of 1939 were constructed by hand with shovels and measured about nine inches wide and six inches deep. Excavated material was placed on a "shaved" area just below the furrows to form small berms to increase the storage capacities of the contour furrows. Natural cross dikes were left in the furrows to prevent complete drainage in case a gulley or small animal burrow provided an outlet. The contour furrows were dug at one-foot vertical intervals, resulting in about an 18-foot spacing on the slope.

In 1946 additional contour furrows were constructed on 52- and 55-H. These were constructed with a "bull" tongue with rolling colter and edge knives mounted on a lister beam. This implement cut a furrow about five inches wide and seven inches deep. Excavated material was scattered along both sides of the furrow. The additional furrows reduced the horizontal spacing between furrows to four or five feet.

The treatment by the eccentric disk created shallow depressions over the surface of the pasture land.

Investigations of Sediment Yield of Agricultural Watersheds

Investigations of sediment yield of agricultural watersheds were initiated in 1957. The objectives were listed as:

1. To investigate the watershed characteristics influencing sediment yield and to devise methods for estimating sediment yield from generally similar ungaged areas, and
2. To determine the effects of conservation practices and nonconservation practices on sediment yields.

The sediment studies largely involved additions to the already existing runoff studies. Relatively little additional equipment was required to collect the sediment records at the existing runoff stations, although substantial additional personnel time was required to collect and process the data.

Sediment data were collected at watersheds W-3 and W-5, the prevailing practice and conservation treated watersheds, for the period 1957-1967 inclusive. At watershed 4-H, data were collected for the period of 1963-1967 inclusive, except for calendar year 1964 when equipment did not operate satisfactorily.

In addition to the sediment studies at the three gaging stations as described above, sediment studies were made of three small reservoirs: the Schumm Pond with a drainage area of 125 acres, the Lampman Pond with a drainage area of 66 acres, and the Meents Pond with a drainage area of 10 acres. The watersheds of the Schumm and Lampman Ponds were in watershed W-5.

The Schumm Pond was constructed in 1961; half of the watershed was in grass or farmed with conservation practices, and half was farmed in straight row clean tilled crops. The Lampman Pond was reconstructed in 1957 after an old pond washed out; the watershed was farmed with conservation practices. The Meents Pond, not draining into any watershed in the project, was constructed in about 1950; its watershed was in heavily grazed permanent pasture.

The watersheds of the ponds are less than one and one half miles apart and have similar soils, land slopes, and climate. All three ponds were equipped with water stage recorders, and all three were surveyed for development of stage-capacity curves. The Meents Pond was equipped with a V-notch weir. (The locations of the ponds are shown in figure 17, shown in a later part of this report.)

CLIMATE OF THE AREA

The climate of the general area of which the experimental watershed was considered to be representative is characterized by cold relatively dry winters, hot summers, fairly heavy summer rainfall, relatively low humidity, and a moderately frost-free growing season.

The long-term mean average temperature over the broad area ranges from 50° to 58°F and the frost-free season from 150 to 190 days. The long-term average precipitation ranges from 20 to 30 inches. Most of the moisture supply for precipitation originates from the Gulf of Mexico; the Rocky Mountains do not permit much moisture from the west to reach the area.

The seasonal march of several climatic factors, as developed from the data of the central meteorologic station at the project, is shown in the following tabulation:

<u>Month</u>	<u>Precipitation</u>	<u>Temperature</u> ^{1/}	<u>Wind</u> ^{1/}	<u>Pan evaporation</u>
	inches	°F	mi/day	inches
Jan.	0.33	22	150	NR
Feb.	.57	28	152	NR
Mar.	1.16	36	183	NR
Apr.	1.98	48	190	6.2
May	3.72	60	159	8.4
June	5.15	70	142	10.0
July	3.07	76	117	10.9
Aug.	2.77	75	112	10.0
Sept.	2.73	66	132	8.5
Oct.	1.14	55	133	6.5
Nov.	.58	39	142	NR
Dec.	.40	28	147	NR
Average or total	23.60	50	147	

It will be noted that the bulk of the annual precipitation, 82 percent, falls during the April-September growing season, providing favorable conditions for crop growth. But the high intensity storms that occur in the early part of the growing season when there is little vegetal cover on the cultivated fields frequently cause severe erosion damage.

^{1/} Monthly averages.

An examination of the precipitation data collected at the Hastings Project during the 1939-1967 period of record was made by Dragoun and McGuinness^{1/} to determine if the period was representative of the long term precipitation of the area. A non-parametric test described by McGuinness and Brakensiek was used^{2/}. Pertinent material from the unpublished report by Dragoun and McGuinness is as follows:

A long-term record of precipitation is available at Red Cloud, Nebraska, extending back to 1873. Red Cloud is about 35 miles south of Hastings and has the same general climate. The Red Cloud precipitation record was split into two parts, 1873 to 1938 and 1939 to 1967. The test of representativeness determines whether the data from the 1939-1967 period could reasonably have been expected to arise from a population with the characteristics of the 1873-1938 period. The strong correlation between Red Cloud and Hastings data makes the results from the Red Cloud data representative test applicable to the Central Great Plains Experimental Watershed area.

For total annual precipitation, the test showed a probability of only 3 percent that the 1939-1967 period data would occur from a population with the 1873-1938 period characteristics. Average annual precipitation was 22.85 inches for the early period and 25.60 inches for the study period. Thus, it seems likely that the experimental period at the station was wetter than would normally be expected.

The same test was performed on the April-through-September growing season data. In this case, the probability was 7 percent with the early and study periods averaging 17.77 and 19.91 inches, respectively. Thus, much of the annual increase was due to increased growing season rainfall.

1/ Dragoun, Frank J. and McGuinness, J. L., Climatology of the Central Great Plains Experimental Watershed near Hastings, Nebraska. Unpublished manuscript dated May 1970.

2/ McGuinness, J. L. and Brakensiek, D. L., Simplified techniques for fitting frequency distributions to hydrologic data. U.S. Dept. Agr. Handb. 259, 42 pp. 1964.

Dragoun and McGuinness also derived intensity-duration-frequency curves from the 1939-1967 precipitation records for the central meteorological station at the project. Their curves are shown in figure 3, and their description of the curves and their comments are as follows:

Figure 3 gives rainfall intensity-duration-frequency curves derived from 1939-1967 data from the Central Great Plains Experimental Watershed record at the central meteorological station. Rainfall durations are from 15 minutes to 24 hours and are for consecutive minutes and not clock-hour data. The curves are from the annual series and have been slightly smoothed. In general, the curves were derived by the methodology outlined in USWB Technical Paper No. 25 (1955)^{1/}.

The curves of figure 3 closely resemble those for North Platte, Nebraska as given in USWB Technical Paper No. 25 although there is a tendency for the curves to flare out more for the longer durations than do those for North Platte. In any event, the possible distortion for higher durations is a relatively minor matter and the curves of figure 3 are considered a good representation of the intensity-duration-frequency relationships of rainfall at the station.

^{1/} U.S. Weather Bureau. Rainfall intensity-duration-frequency curves. USWB Tech. Paper No. 25, 53 pp. 1955.

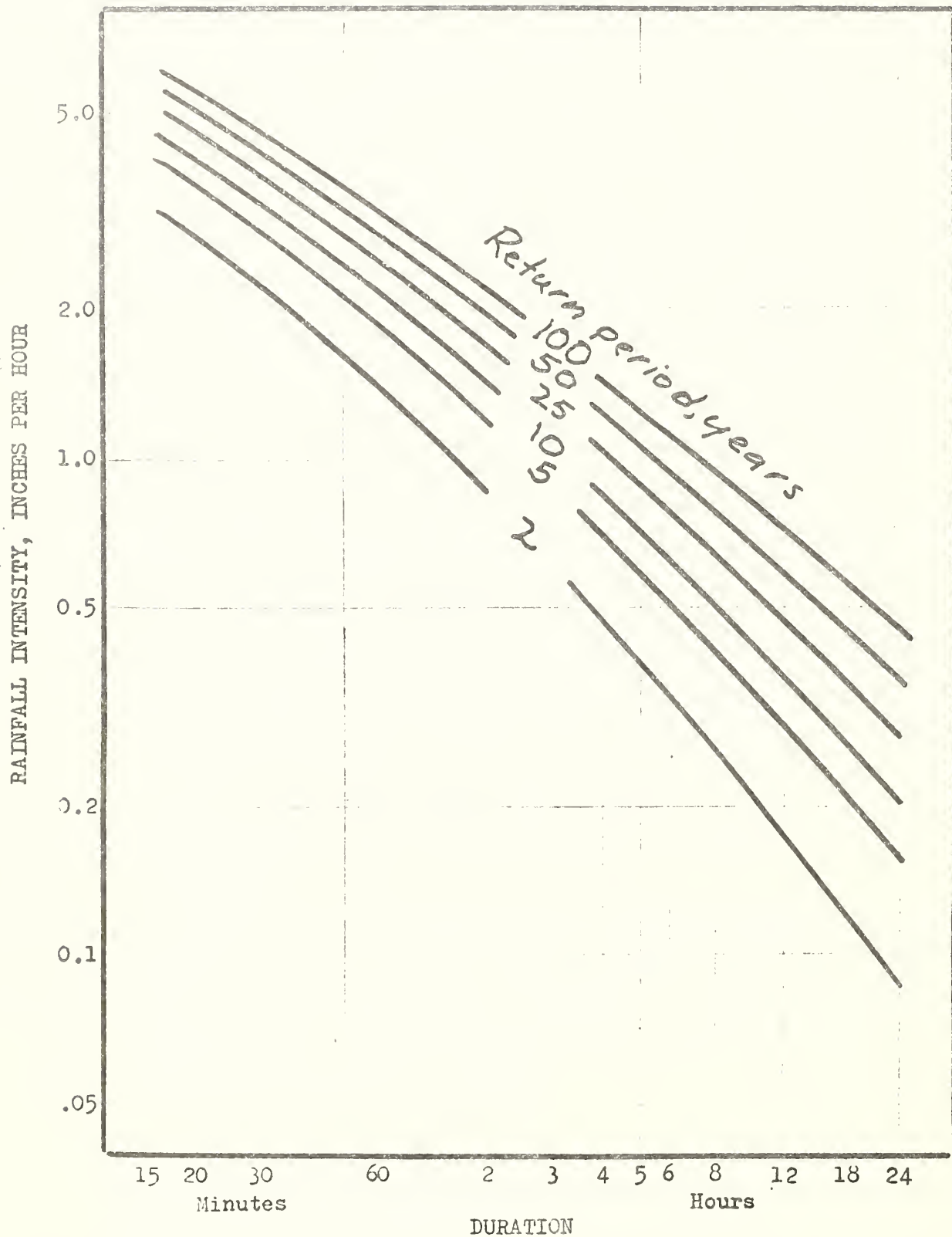


Figure 3.—Rainfall intensity - duration - frequency curves, 1939 - 1967

LOCATION OF THE EXPERIMENTAL WATERSHED

The lands of the discontinued Central Great Plains Experimental Watershed are in the rolling loessial area of the Central Great Plains Winter Wheat and Range Region (H) as shown on the section of map in figure 4. The original map, prepared and published by the Soil Conservation Service in January 1963, is titled "Land Resource Regions and Major Land Resource Areas of the United States." The lands of the experimental watersheds are considered to be generally representative, hydrologically, of the Central Nebraska Loess Hills (H-71), the Rolling Plains and Breaks (H-73), and the Central Loess Plains (H-75).

The experimental area was located in the south central portion of Nebraska, in Webster County. The extreme north boundary of the major watershed is located about one-half mile south and one mile west of Rosemont, Nebraska. The watershed is comprised of the area drained by the northern-most and western-most branches of Beaver Creek, a direct northern tributary of the Republican River.

The experimental area lies in the latitude of about $40^{\circ} 14'$ north and the longitude of about $98^{\circ} 22'$.



Figure 4.—Section of map "Land Resource Regions and Major Land Resource Areas of the United States". The Central Great Plains Experimental Watershed is at location 44. The physiographic and hydrologic characteristics of the experimental watershed are considered to be generally representative of Major Land Resource Areas: (71) the Central Nebraska Loess Hills, (73) the Rolling Plains and Breaks, and (75) the Central Loess Plains which lie within (H), Central Great Plains Winter Wheat and Range Land Resource Region. Base map of Resource Regions and Resource Areas constructed by the Soil Conservation Service, January 1963.

TOPOGRAPHY AND SURFACE DRAINAGE FEATURES

The stream system draining the major part of the experimental area consists of two forks of Beaver Creek, a direct south-flowing tributary of the Republican River. The two forks unite a short distance below the lowest hydrologic observation point of the project--the gaging station for watershed W-11. Gaging stations for watersheds W-3, -8, and -11 are on the west fork and gaging station W-5 is on the east fork. Most of the 25 small watersheds and pasture plots lie within the Beaver Creek drainage; but small watersheds 1-, 2-, 18-, 22-, 23-, and 25-H, and pasture plots 55-, 56-, 57-, and 58-H lie to the north of this drainage and in the watershed of the Little Blue River.

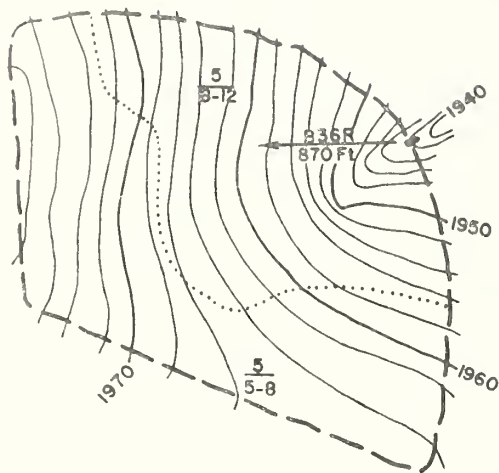
The forks of Beaver Creek with their many small feeder drains have split the area into long tongues of gently rolling uplands. Lands of less than five-percent slope occur on 47 percent of the area and land steeper than 12 percent on only six percent of the area.

Elevations range from a high of about 2002 feet above mean sea level at the northern boundary of watershed W-3 to a low of about 1836 feet on the bed of the stream at gaging station W-11.

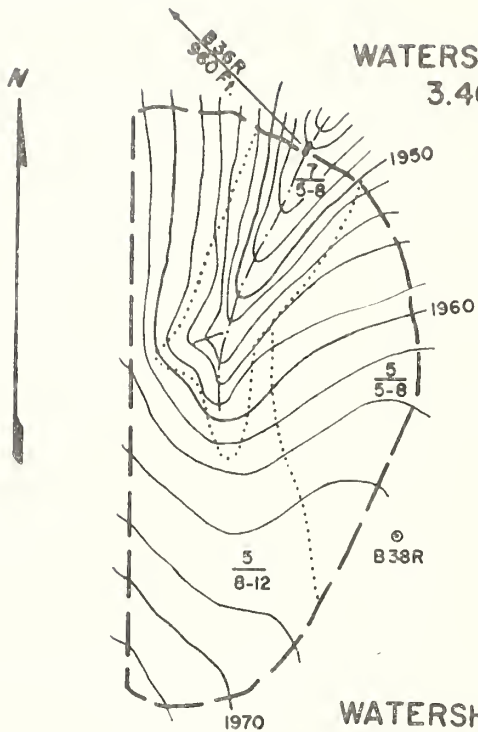
The Soil Conservation Service, in 1940, made a topographic survey of the entire area and developed the five-foot contour interval topographic map included in the folio. Conventional symbols, the legend for which is given on the back of each sheet, portray the various features of topography, drainage, and culture. Soil features, developed from the field soil survey made in 1939, are overlain on the sheets. The boundaries of all watersheds and plots (except 25-H) and all instrumentation in place at the time of the field survey are also shown.

Topographic maps of each of the 24 small watersheds and eight pasture plots were also made in the early years of the project. These two-foot contour interval maps are shown as figures 5 through 12. The map of small watershed 25, made at a later date, is shown in figure 13.

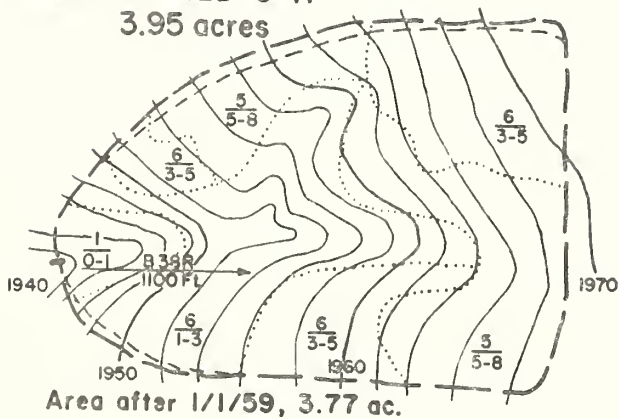
WATERSHED 1-H
3.62 acres



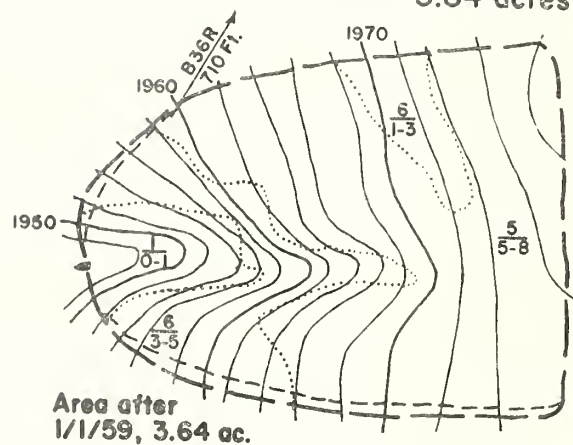
WATERSHED 2-H
3.40 acres



WATERSHED 3-H
3.95 acres



WATERSHED 4-H
3.84 acres



LEGEND

- B36R
870 Ft. → Distance and direction to nearest rain gage.
- Gaging station.
- Original watershed boundary.
- - - Watershed boundary after 1/1/59.
- ~ Contours.
- Soil boundaries.
- $\frac{5}{5-8}$ Numerator is soil type; denominator is range of top soil depth, in inches.

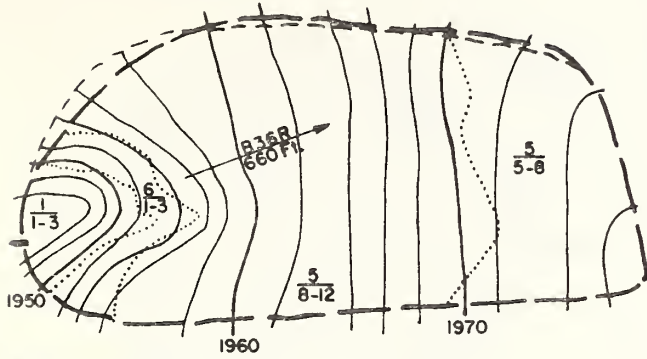


Figure 5. Watersheds 1-H, 2-H, 3-H, & 4-H.

WATERSHED 5-H

3.93 acres

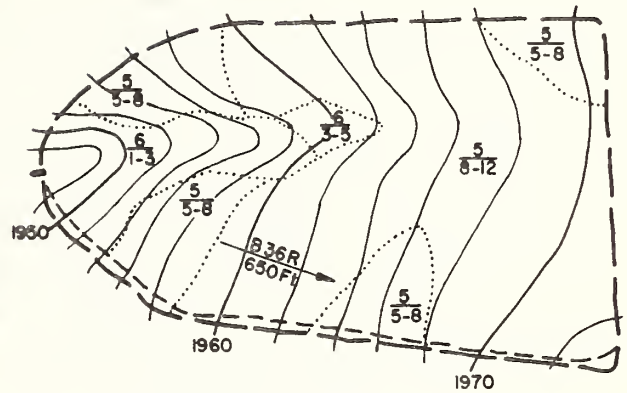
Area after 1/1/59, 4.02 ac.



WATERSHED 6-H

4.16 acres

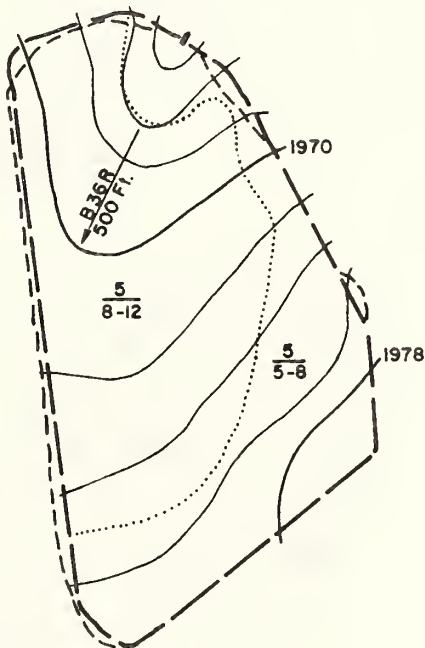
Area after 1/1/59, 4.01 ac.



WATERSHED 8-H

3.93 acres

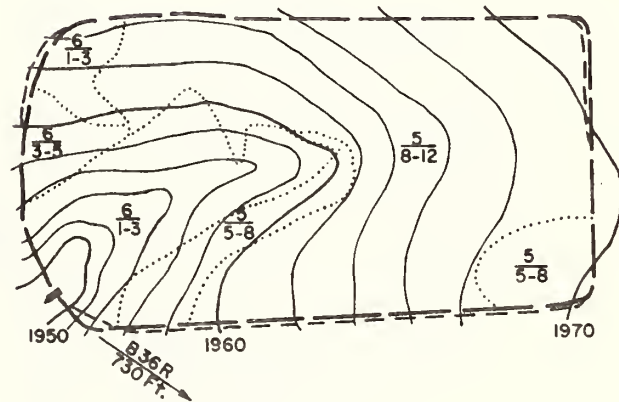
After 1/1/59, 3.97 ac.



WATERSHED 7-H

4.15 acres

Area after 1/1/59, 4.26 ac.



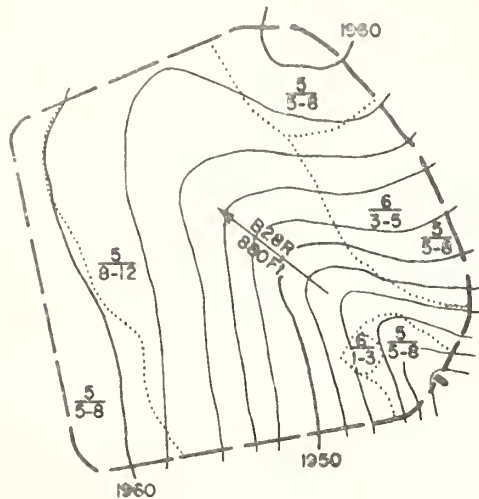
LEGEND

- B36R 870 Ft. → Distance and direction to nearest rain gage.
- ▲ Gaging station.
- Original watershed boundary.
- - - Watershed boundary after 1/1/59.
- ~ Contours.
- Soil boundaries.
- $\frac{5}{5-8}$ Numerator is soil type; denominator is range of top soil depth, in inches.

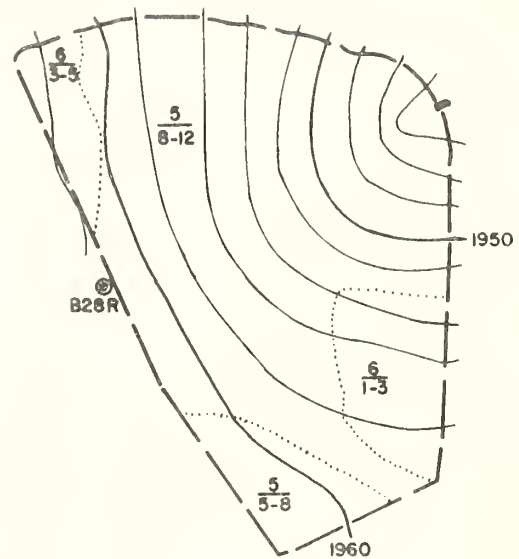
SCALE
50 0 50 100
FEET

Figure 6. Watersheds 5-H, 6-H, 7-H, & 8-H

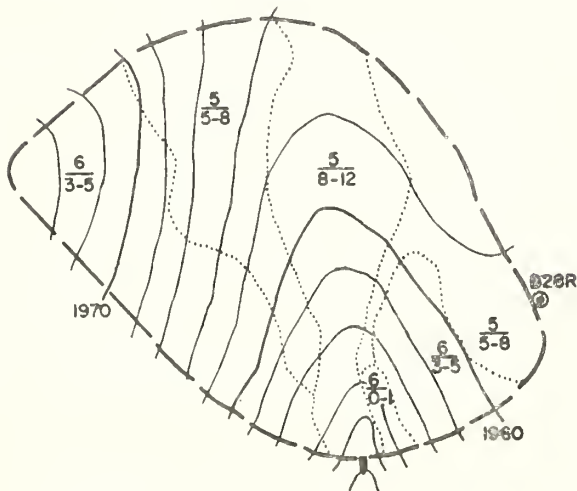
WATERSHED 9-H
3.78 acres



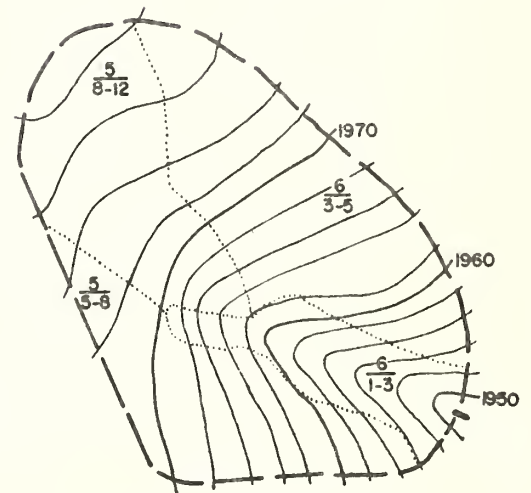
WATERSHED 10-H
3.98 acres



WATERSHED 11-H
3.85 acres



WATERSHED 12-H
3.66 acres



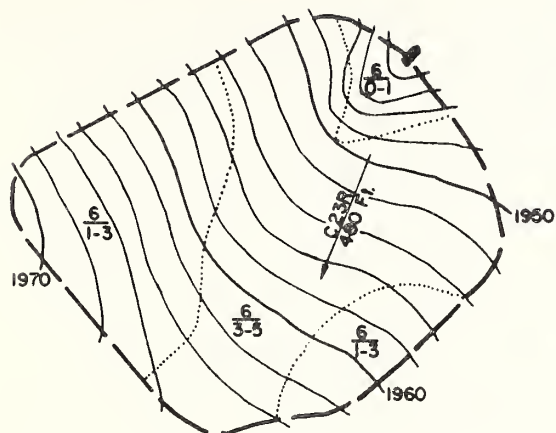
LEGEND

- B36R → 870 Ft. Distance and direction to nearest rain gage.
- Gaging station.
- Original watershed boundary.
- - - Watershed boundary after 1/1/59.
- Contours.
- Soil boundaries.
- $\frac{5}{5-8}$ Numerator is soil type; denominator is range of top soil depth, in inches.

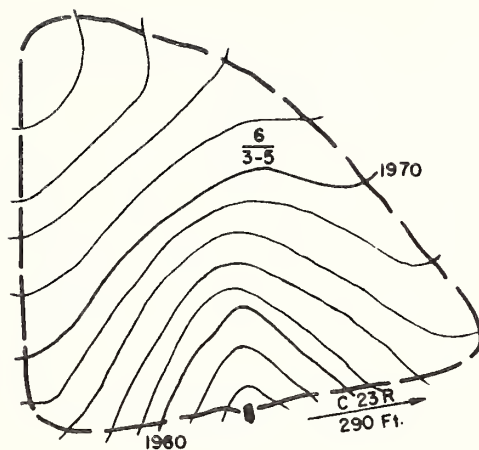
SCALE
50 0 50 100
FEET

Figure 7. Watersheds 9-H, 10-H, 11-H, & 12-H.

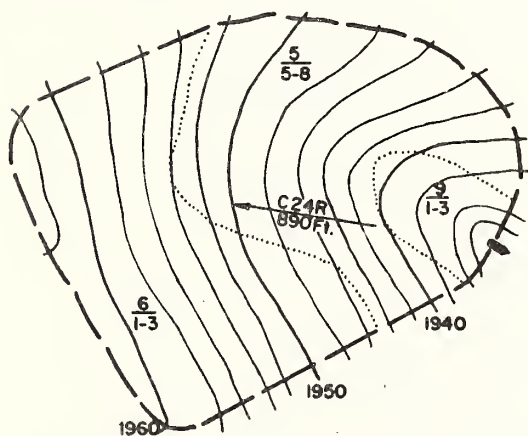
WATERSHED 13-H
3.41 acres



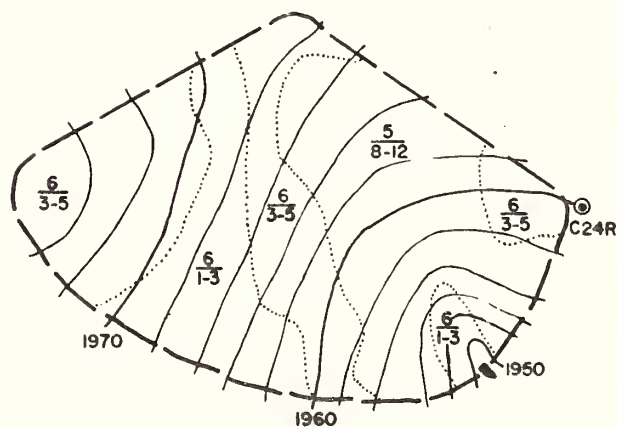
WATERSHED 14-H
3.35 acres



WATERSHED 15-H
3.62 acres



WATERSHED 16-H
3.57 acres



LEGEND

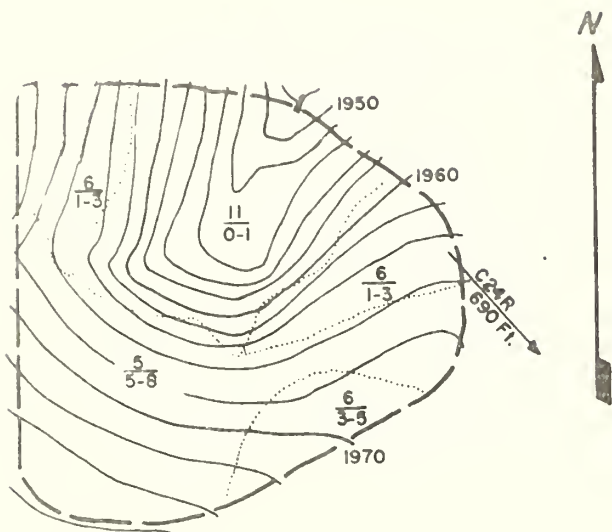
- 836R** → Distance and direction to nearest raingauge.
870 Ft.
 Gaging station.
 Original watershed boundary.
 Watershed boundary after 1/1/59.
 Contours.
 Soil boundaries.
5
5-8 Numerator is soil type; denominator is range of top soil depth, in inches.

SCALE

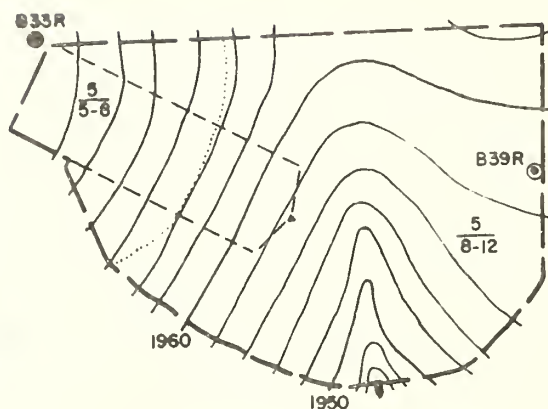
 50 0 50 100
 FEET

Figure 8. Watersheds 13-H, 14-H, 15-H, & 16-H.

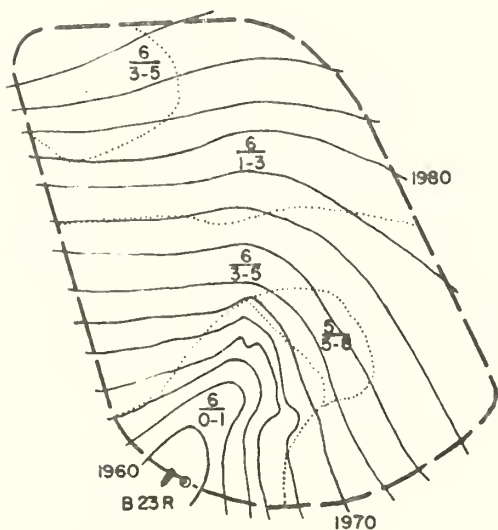
WATERSHED 17-H
3.96 acres



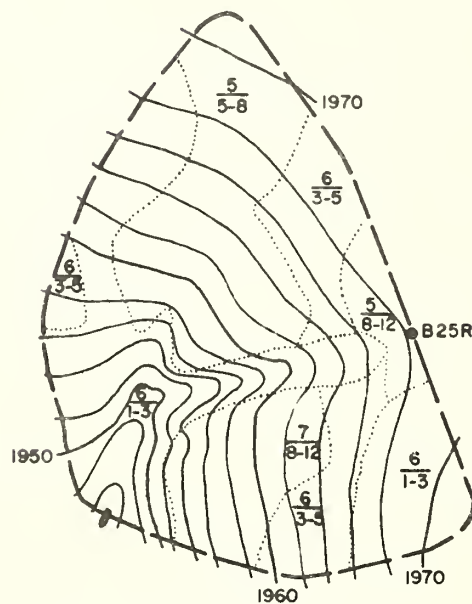
WATERSHED 18-H
3.74 acres



WATERSHED 19-H
4.10 acres



WATERSHED 20-H
4.05 acres



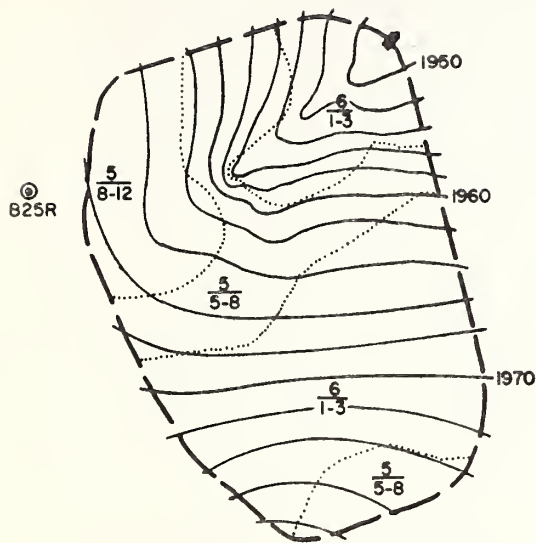
LEGEND

- $\frac{B36R}{870 \text{ Ft.}}$ → Distance and direction to nearest raingage.
- Gaging station.
- Original watershed boundary.
- Contours.
- Soil boundaries.
- $\frac{5}{5-8}$ Numerator is soil type; denominator is range of top soil depth, in inches.

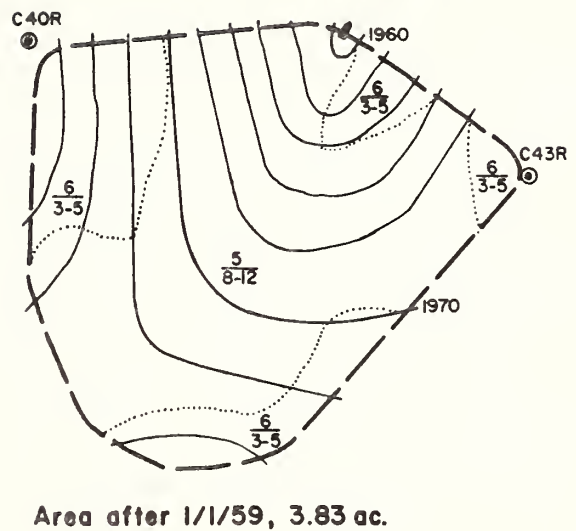
SCALE
50 0 50 100
FEET

Figure 9. Watersheds 17-H, 18-H, 19-H, & 20-H.

WATERSHED 21-H
3.94 acres

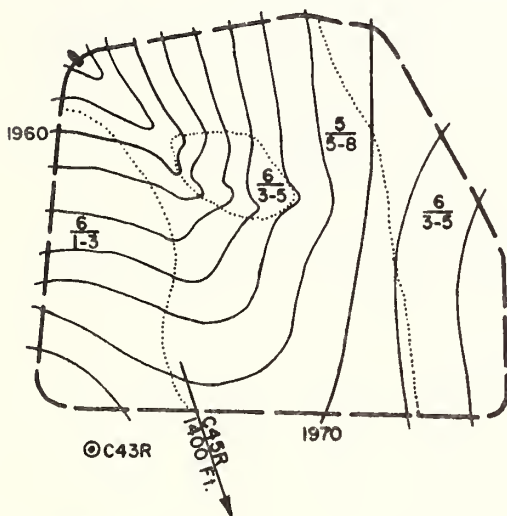


WATERSHED 22-H
3.99 acres

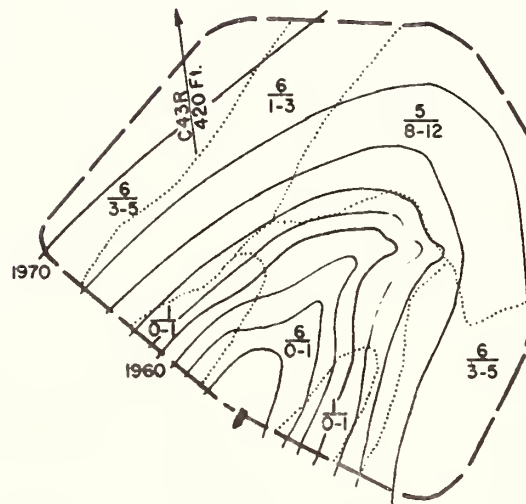


Area after 1/1/59, 3.83 ac.

WATERSHED 23-H
4.06 ~~4.20~~ acres
Area after 1/1/59, 4.20 ac.



WATERSHED 24-H
4.21 acres



LEGEND

- B36R** Distance and direction to nearest rain gage.
- 870 Ft.**
- Gaging station.
- Original watershed boundary.
- Contours.
- Soil boundaries.
- 5/5-8** Numerator is soil type; denominator is range of top soil depth, in inches.



Figure 10. Watersheds 21-H, 22-H, 23-H, & 24-H

PASTURE PLOTS

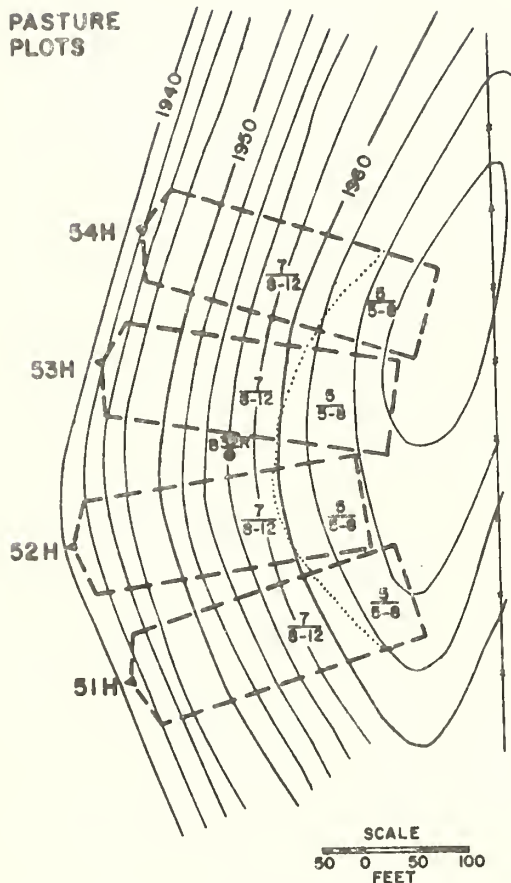


Figure 11. Plots 51-H, 52-H, 53-H, & 54-H.

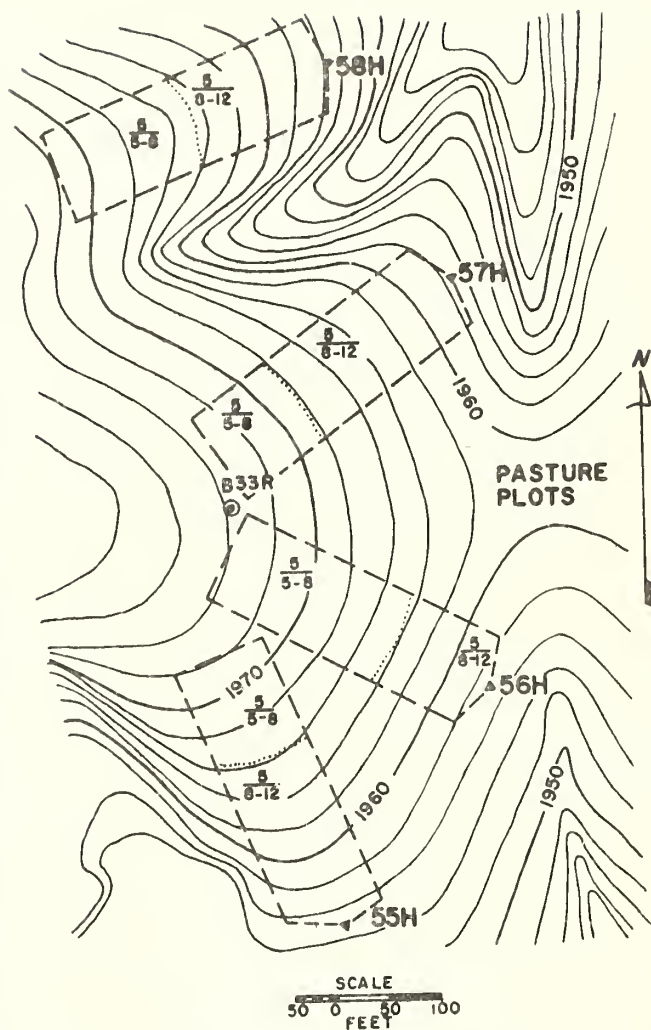
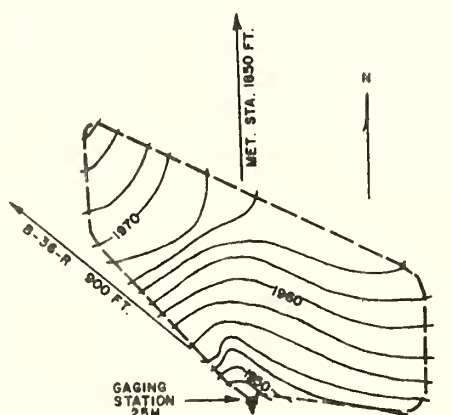


Figure 12. Plots 55-H, 56-H, 57-H, & 58-H.



WATERSHED 25-H
2.24 ACRES

100 0 100
SCALE IN FEET
CONTOUR INTERVAL - 2 FEET
--- WATERSHED BOUNDARY

Figure 13. Watershed 25-H

Table 4 presents information abstracted from the above surveys and maps. It should be noted that the information on slope was developed primarily from the soil survey made in 1939, described in a later section.

In 1962 a survey of the stream channel and flood plain between gaging stations W-8 and W-11 was made. The cross sections and profile developed from this survey are included in the folio.

The channels of the streams in the area are relatively small and not deeply encised. Figures 14 and 15 are typical of the channels of the watersheds. Though the lands adjacent to the channels are largely in pasture, thick growths of weeds may choke the channels in years when conditions are favorable.

Table 4.—Area, elevation difference, length of waterway, and slope for all watersheds and plots

Watershed or plot no.	Area		Eleva- tion differ- ence 2/	Length of principal waterway 3/	Percent of watershed in each slope class 4/					Aver- age slope 5/
	First survey	After Jan.1 1959 1/			slope class in percent					
					0-2	2-5	5-8	8-12	12+	
	acres	acres	feet	feet						percent
W-3	481	--	77	8,920	26	28	21	15	10	5.4
W-5	411	--	130	7,560	14	25	43	9	9	5.9
W-8	2,086	--	110	26,100	20	24	36	14	6	5.6
W-11	3,490	--	166	38,300	20	31	34	10	5	5.2
1-H	3.62	--	36	440	4	12	43	37	4	7.2
2-H	3.40	--	29	620	8	38	25	19	10	6.7
3-H	3.95	3.77	31	620	1	36	39	19	5	6.1
4-H	3.84	3.64	32	530	1	41	39	15	4	6.2
5-H	3.93	4.02	32	680	2	51	33	11	3	4.9
6-H	4.16	4.01	26	680	6	63	21	9	1	4.4
7-H	4.15	4.26	21	630	11	42	41	4	2	4.6
8-H	3.93	3.97	16	670	16	74	10	0	0	3.0
9-H	3.78	--	20	530	14	42	37	7	0	4.8
10-H	3.98	--	30	520	5	60	35	0	0	3.9
11-H	3.85	--	24	600	16	37	42	5	0	4.5
12-H	3.66	--	29	600	4	41	30	23	2	5.8
13-H	3.41	--	29	470	2	31	57	10	0	5.6
14-H	3.35	--	25	500	0	41	46	13	0	5.4
15-H	3.62	--	30	540	3	23	62	11	1	5.8
16-H	3.57	--	26	560	2	61	32	4	1	4.6
17-H	3.96	--	27	500	3	27	38	27	5	7.0
18-H	3.74	--	30	530	4	37	52	6	1	4.9
19-H	4.10	--	28	515	0	45	52	3	0	5.7
20-H	4.05	--	26	560	0	45	37	11	7	6.1
21-H	3.94	--	30	580	0	47	40	11	2	5.7
22-H	3.99	3.83	18	500	8	69	23	0	0	3.8
23-H	4.06	4.20	22	620	0	68	25	7	0	4.5
24-H	4.21	--	18	475	0	58	24	14	4	5.0
25-H	2.24	--	30	450	6/	6/	6/	6/	6/	6/
51-H	.69	--	25	310	0	17	39	38	6	8.0
52-H	.69	--	25	308	0	0	59	38	3	8.1
53-H	.69	--	25	308	0	8	36	56	0	8.1
54-H	.69	--	25	308	0	10	37	53	0	8.1
55-H	.69	--	18	308	0	10	90	0	0	5.8
56-H	.69	--	18	308	0	25	75	0	0	5.8
57-H	.69	--	17	308	0	10	90	0	0	5.5
58-H	.69	--	17	308	0	23	77	0	0	5.5

Footnotes on next page

Footnotes for Table 4.

- 1/ Reconstruction of boundary dikes resulted in slight change in area.
- 2/ Difference between highest and lowest elevations in watershed.
- 3/ Distance from gaging station to most remote point on the watershed boundary, measured along the flood plain of the waterway.
- 4/ From soil survey of 1939.
- 5/ Average slope for W-3, -5, -8, and -11 and 19-H through 25-H is the weighted average of the slope groups in the five preceding columns; that for watersheds 1-H through 18-H is obtained by the contour length method; and that for plots 51-H through 58-H is quotient of elevation difference and length of waterway.
- 6/ From the soil survey of 1963: 9 percent in slope class of 0-3 percent and 91 percent in slope class of 3-10 percent; average slope, 6 percent.



Figure 14.—Channel downstream from gaging station W-8.
Submergence gage in background.



Figure 15.—Typical channel during late dormant season.

This section is abstracted from "Description of Central Great Plains Experimental Watershed," an unpublished manuscript prepared by L. E. Mitchell and L. L. Kelly, both of the Soil Conservation Service, in 1942. The geology section of that report drew heavily on information in Nebraska Geological Survey Bulletin No. 10, Second Series, by A. L. Lugin, supplemented by test drilling information.

The geology of the Central Great Plains Experimental Watershed is similar to that of most of south central Nebraska. Briefly, it is an erosional surface on Cretaceous formation; mantled by thick fluvial and eolian deposits of Pleistocene age. The plain, sloping to the south and southeast, constitutes the "floor" on which the Pleistocene sediments were deposited.

Well Logs

The thickness of the eolian deposits and portions of the fluvial deposits are shown by samples taken of two wells drilled in the experimental area. The first well was located a short distance north of the watershed, at the site of the field office buildings in the NE 1/4 SE 1/4 Sec. 31-T4N-R9W. The second well was at the extreme south end of the watershed, close to gaging station W-11, in the NW 1/4 NW 1/4 Section 29-T3N-R9W. The logs and correlations of the samples of both wells, made by E. C. Reed, then Assistant State Geologist of the Conservation and Survey Division of the University of Nebraska, are as follows:

Well No. 1

1. Peoria Loess (includes some soil at top), 0 to 18 feet:
 - (1) Soil, buff to dark brown silty clay, 0 to 4 feet.
 - (2) Clay, buff to brownish, silty 4 to 6 feet.
 - (3) Clay, yellowish buff, silty to fine sandy, 6 to 18 feet.

2. Loveland formation, 19 to 110 feet:

- (1) Clay, pinkish gray, argillaceous to silty, 18 to 30 feet.
- (2) Clay, as above, with some light gray, limy aggregates, 30 to 33 feet.
- (3) Clay, very light pinkish gray, silty, moderately to very calcareous, 33 to 45 feet.
- (4) Clay, pinkish, argillaceous to silty, non-calcareous, 45 to 48 feet.
- (5) Clay, light pinkish gray, silty, calcareous, 48 to 60 feet.
- (6) Clay, pinkish buff, silty, only partially calcareous, 60 to 63 feet.
- (7) Clay, light pinkish gray, calcareous, 63 to 84 feet.
- (8) As above, slightly more argillaceous, 84 to 87 feet.
- (9) No samples, 87 to 110 feet.
- (10) Clay, pinkish, argillaceous to silty, only slightly calcareous, 110 feet.

3. Sand and gravel, 110 to 117 feet (total depth of well):

Sand, light gray, medium grained to coarse and pebbly, up to 1/8 inch in diameter.

Well No. 2

1. Peoria loess (includes some soil at top) 0 to 15 feet:

- (1) Soil and clay, buff, silty to sandy, 0 to 5 feet.
- (2) Clay, yellowish buff, silty to sandy, 5 to 15 feet.

2. Loveland formation, 15 to 25 feet:
 - (1) Clay, pinkish gray, silty to sandy, 15 to 20 feet.
 - (2) Clay, as above, with some fine grained to pebbly sand, 20 to 25 feet.
3. Sand and gravel, 25 to 45 feet:
 - (1) Sand, gray to black, medium fine to coarse, in large part cemented with manganite, 25 to 30 feet.
 - (2) Sand, medium grained to coarse and pebbly, with common pink feldspar, 30 to 35 feet.
 - (3) Sand and gravel up to 1/4 inch or more in diameter, 35 to 40 feet.
 - (4) Sand and gravel up to 1/8 inch or more in diameter, 40 to 45 feet.
4. Clay, 45 to 60 feet:
 - (1) Gray to slightly greenish, silty clay, 45 to 55 feet.
 - (2) Light gray, silty clay, with some sand and gravel, 55 to 60 feet.
5. Sand and gravel, 60 to 70 feet (total depth of well):
 - (1) Sand, medium grained to coarse and pebbly, up to 1/8 inch in diameter, 60 to 65 feet.
 - (2) Sand and gravel up to 1/4 inch in diameter, with some silty clay admixture (may be from above), 65 to 70 feet.

It will be noted that while Well No. 1 is the deeper of the two wells, more of the older formations are present in Well No. 2. This is due to the greater thickness of the Loveland formation in Well No. 1.

The bedrock of south central Nebraska is chiefly Pierre and Niobrara formations of Cretaceous age. Ogallala sandstone of Tertiary Age is present in some areas. The bedrock map of Nebraska indicates Ogallala is the bedrock material in this experimental area. The Pierre is a dark gray, tough, plastic shale, that contains calcareous zones.

The Niobrara formation is predominately a hard, gray, calcareous shale with zones of hard, argillaceous limestone or chalk. When the Niobrara occurs next below the Pleistocene, it may be jointed and fractured and these cracks form channels through which groundwater migrates. There are many exposures of this formation in the Republican Valley.

The bedrock is minutely dissected by many small valleys that cut deep into the Niobrara and Pierre shales. These valleys were later filled by sands and gravels and later Loveland and Peoria loess deposits. Such a succession of valley sculpturing and deposition makes the detail of the area complicated.

The bedrock north of the Republican River Valley is this surface of valleys and ridges. The general bedrock surface slopes southward and southeastward. The thickness of the Pleistocene deposits range from a few feet in localized areas near the Republican River Valley to 250 feet thick in Adams and Clay Counties.

Sand and Gravel Deposits

Fluviatile deposits of sand and gravel underly the plains north of the Republican River in south central Nebraska. Two separate beds of

sand and gravel often occur and are usually separated by clay, but in the immediate vicinity of the Republican River this clay seems to be missing. It has been estimated that these deposits are present under an area of 15,000 to 20,000 square miles in Nebraska. In many places their total thickness exceed 100 feet. The material of these deposits was transported into the State by rivers from the West and Northwest.

The lower sand and gravel is generally coarse near the base and finer toward the top. Quartz and other granite and metamorphic crystalline minerals and rock fragments constitute the material of the formation. It contains some outwash material from the Nebraskan glacier near the margin of that ice sheet. It is an inwash-outwash fluvio-glacial deposit, which was built up during the Nebraskan age, as an alluvial plain, in south central Nebraska. Because it was deposited on a somewhat irregular bedrock surface the thickness is quite irregular. The average thickness has been estimated to be around 75 feet.

The upper sand and gravel is thought to have had the same origin and mode of formation as the lower. The deposits may be an inwash-outwash equivalent of the Kansas till and early Kansas inter-till

sands and gravels of eastern Nebraska. It averages about 75 feet in thickness of which the upper 30 to 50 feet are usually quite fine sand. It is thought that the finer material may have been colian in origin. The lower portion of the formation contains coarser gravel and is clearly a fluvial deposit. This deposit has about the same distribution as the lower.

It is of special note that these sand and gravel beds furnish water for most of the municipal, irrigation and farm wells in this region.

Loveland Formation

The typical Loveland formation consists of two fairly distinct deposits that grade gradually from one to the other. The lower portion is composed of poorly sorted sand and gravel with much clay. The upper portion of the formation is a loess-like clayey silt. This loess-like deposit is the more widespread of the two deposits, and covers approximately the same area in Nebraska as the Peoria loess deposits.

The thickness of the Loveland formation is quite variable. This is clearly evidenced in the two wells described above in which Well No. 1 showed a thickness of 92 feet and Well No. 2 showed a thickness of only 10 feet.

The lower part of the Loveland crops out in the very southwest corner of the experimental area. It occurs as a reddish discontinuous band on lower slopes. The total area of this material is insignificant insofar as the soil characteristics are concerned.

Where the loess-like Loveland is the soil parent material, a dark brown, granular, soil has developed and is correlated with the Geary series.

Peoria Loess

Peoria loess is the parent material of the Coly, Hastings, and Holdrege soils in the watershed. It is a pale yellow or buff colored wind deposited clayey silt that mantles a large area in the upper Mississippi Valley States.

Due to the uneven topography of the older Loveland formation, the thickness of the Peoria loess varies considerably. In the Beaver Creek Watershed the thickness varies from 0 to 20 or 30 feet. On the upper portions of some of the hills the deposit of Peoria loess is very thin or entirely lacking and the reddish brown Loveland loess is exposed.

SOILS OF THE EXPERIMENTAL AREA

The field work for the soil survey of the experimental watershed was done in 1939 by L. E. Mitchell of the Soil Conservation Service. The classification and correlation of the soil names used in the 1939 soil survey were updated in 1974 by J. R. Culver of the Soil Conservation Service. The soil survey of 1939 was made specifically for the experimental watershed.

A modern soil survey of Webster County was completed in 1963. This modern soil survey was not made specifically for the detail needed in the experimental watershed. Thus, for this report, all soils information herewith is based on soil delineations of the 1939 soil survey, with updated soil names based on the classification and correlation of soils in 1974.

Methods and Definitions

A soil survey of the Beaver Creek experimental watershed was made in August and September of 1939. Aerial photographs on a scale of approximately 1-inch equals 400 feet, were used in the field mapping. The soils, slopes, erosion, and land use were mapped, together with the creeks, streams, gullies, roads, fences, farmsteads, schools, churches and other physical features. The features of the soil survey were superimposed on the topographic base map to develop the map contained in the folio. Soils, erosion, and slope are indicated on the maps in the folio by a composite symbol. The extent of the area to which the symbol applies is defined by green boundary lines.

Three land use classes are shown on the map: cultivated land, permanent pasture, and native hay land. The permanent pastures are in native grass and, with the native hay land, are usually located along the creeks and low spots or on areas too steep to cultivate. No woodland was mapped since areas of this type of land are negligible in size.

The slope class limits are: A - less than two percent; B - two to five percent; BB - five to eight percent; C - eight to twelve percent; D - over twelve percent.

Usually the degree of erosion was estimated by comparing the present depth of remaining topsoil with the depth of topsoil on a comparable virgin soil of the same type. The exception to this statement is made in the case of the Hastings silty clay loams and the Geary silty clay loams and the complexes in which they appear. These soil types are the eroded phases of the silt loam types and erosion on them has been mapped on the basis of the depth of the remaining "B" horizon. For example, a Hastings silty clay loam mapped with a 1 erosion symbol (less than 25 percent of the topsoil removed) could be considered the equivalent of a Hastings silt loam with a 3 erosion (less than 25 percent of the subsoil removed).

Erosion conditions throughout the watershed are quite variable. The steeper slopes along the drains in cultivated fields have suffered severe erosion. In many places the Peoria loess is exposed. All of the small upland drainages have shallow deposits along their courses.

In general the undulating upland areas have suffered only slight to moderate water and wind erosion. Some wind erosion has occurred, as is indicated by shallow deposits along fence rows. A few small local exposed areas appeared to have been denuded by wind and local opinion indicates that topsoil losses have been appreciable in the past. While the presence of such erosion must be recognized, wind erosion was not considered of sufficient importance to attempt to map.

Gully erosion in the watershed is not severe. The depths and numbers of gullies on the long slopes are both small. Individual gullies are not more than one foot in depth and two feet in width, and they are usually over 100 feet apart. Most of this erosion occurs in the form of the small "shoe string" type that is obliterated from year to year by normal tillage operations.

The various types and degrees of erosion and the symbols used to designate them on the folio maps are as follows:

Sheet erosion

- 1 Slight erosion: Less than 25 percent of topsoil removed.
- 2 Moderate sheet erosion: 25 to 50 percent of topsoil removed.
- 22 Severe sheet erosion: 50 to 75 percent of topsoil removed.
- 3 Very severe sheet erosion: 75 percent or more of topsoil removed, or all topsoil and less than 25 percent of subsoil removed.
- 4 Sheet erosion of upper subsoil: All topsoil and 25 to 75 percent of subsoil removed.

Gully erosion

Frequency:

- 7 Occasional gullies: More than 100 ft. apart.
- 8 Frequent gullies: Less than 100 ft. apart but including less than 75 percent of the area delineated.

Miscellaneous

- 0 Undifferentiated erosion.
- 0 No apparent erosion.
- + Recent alluvial or colluvial deposits.

Descriptions

The soils of the Beaver Creek watershed have mostly dark colored surface layers (A horizons) and well expressed subsoils (B horizons). The colors of the surface layers are mainly dark grayish brown, dark brown and dark gray. With the exception of the Geary series, all of the soils on uplands have formed in Peoria loess. The Geary series have formed in the Loveland loess and are characterized by their reddish brown subsoil color. The soils are deep and most of them have friable silt loam surface layers. A few areas of silty clay loams were mapped but the total acreage is small. All of the soils on uplands are characterized by the presence of a zone of lime accumulation in the lower B horizon or the C horizon and a granular structure in their surface layers. The present soil taxonomy indicates most of the soils on uplands have mollic epipedons and argillic horizons.

On the basis of topographical landscape positions, the soils are grouped as indicated below. To the right of each modern soil name is given the soil name used in the 1939 soil survey.

Upland Soils

Modern soil name	Soil name used in 1939
1 - Coly silt loam	Colby silt loam
2 - Coly-Geary complex	Colby-Nuckolls complex
3 - Crete silt loam	Crete silt loam
4 - Fillmore silty clay loam	Fillmore silty clay loam
5 - Hastings silt loam	Hastings silt loam
6 - Hastings silty clay loam	Hastings silty clay loam
7 - Holdrege silt loam	Holdrege silt loam
8 - Geary silt loam	Nuckolls silt loam
9 - Geary silty clay loam	Nuckolls silty clay loam
10 - Geary-Holdrege silt loams	Nuckolls-Holdrege silt loams
11 - Geary-Holdrege silty clay loams	Nuckolls-Holdrege silty clay loams

Terrace Soils

12 - Hord silt loam	Hall silt loam
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Bottom Soils

13 - Hobbs silt loam	Judson silt loam
14 - Hobbs silt loam	Judson-Wabash silt loams
15 - Hobbs silt loam, calcareous variant	Lamoure silt loam

On the maps in the folio, soil type is indicated by the number preceding them as shown in the above lists.* The following descriptions of the soil series of the Beaver Creek watershed reflect the current references and soil correlation.

Coly Series: The Coly soils have light colored, limy, friable silty soils formed in loess deposits of Peoria age. They are on sloping areas throughout the Typic Ustoll region of Nebraska and Kansas.

In the Beaver Creek watershed the Coly soils are on slopes of upland drains. The thickness of the A horizons in these positions has been curtailed by water erosion.

These soils typically have a thin grayish brown silt loam surface layer over a light gray silt loam to a depth of 60 inches or more. The soil is calcareous throughout the profile. Nearly all of their lime is in finely divided form. In many places, the surface layer rests directly on the parent loess formation.

The Coly delineations in this area include small areas of Hastings or Holdrege soils. These areas are so small that mapping them would be impractical.

Coly soils are associated with Geary and Holdrege soils. They lack the subsoil horizon that is typical of those soils, have a thinner surface layer, and have lime higher in the profile.

In the watershed area much of the Coly soil is under cultivation; corn and wheat are the chief crops grown.

* (Note to editor: In the folio of maps, the "Explanation of symbol" is incorrect. The example should be re-arranged to read "5B27" and the two explanatory lines following re-arranged with the soil, slope, and erosion in proper order.)

Coly-Geary complex: This complex consists of Coly silt loam and Geary silty clay loam. These soils are confined mostly to the steep slopes of the drainageways where erosion has been quite severe. The Coly soils in this complex are similar to the soils described for the Coly series description. The Geary soils in this complex have a thinner surface layer of silty clay loam than the soils described for the Geary series. Due to erosion the color, texture and thickness of the surface layer is variable. In places, the surface layer is a pale yellow to reddish brown.

Crete series: The Crete series consists of deep, dark, somewhat poorly drained soils with claypan subsoils. They have formed in Peoria loess on nearly level or very gently sloping uplands. They have formed under a vegetative cover of mixed tall and short grasses. These soils are extensive on the loess plains in southeastern Nebraska and northeastern Kansas. Surface runoff and internal drainage are slow.

The surface layers vary from 12 to 16 inches in thickness and are very dark grayish brown. They are mostly silt loams and have a friable structure.

The upper part of the subsoil is a brown to dark grayish brown clay or silty clay 10 to 20 inches in thickness. This layer is almost impervious to water. The structure is weak prismatic or subangular blocky to massive. This horizon is locally referred to as a "claypan".

The lower part of the subsoil is a transitional layer of four to six inches of slightly lighter colored, more friable silty clay loam. Below this the underlying material consists of a pale yellow to grayish-yellow calcareous silt loam containing scattered brown or reddish brown stains. In this lower layer, or zone of carbonate enrichment, the lime occurs in finely divided form and as hard concretions one-eighth to one-fourth inch in diameter. The parent material of Peoria loess from which the Crete soils have formed usually has no zone where carbonates are segregated.

Included with these soils are areas of Hastings silt loam.

The soils of the Crete series are associated with Fillmore, Hastings and Holdrege soils. They differ from the Holdrege and Hastings soils by having more clay in the subsoil and commonly, a higher-lying zone of carbonate enrichment. These are better drained and have a more brownish-colored claypan subsoil than the associated Fillmore soils in this area. In addition, they have thicker surface layers than Fillmore soils and have more lime in their subsoils.

Crete soils are nearly all cultivated. They produce corn, wheat, and grain sorghum. Sweet clover, alfalfa and rye are grown in minor amounts.

Fillmore series: The Fillmore series consists of deep, dark, poorly drained soils with claypan subsoils. They have formed in loess. They occupy poorly drained, nearly level basins that have no surface drainage outlets. The basins are widely scattered throughout central Nebraska. Most areas are less than 10 acres in size.

The surface layer is a heavy silt loam or silty clay loam 6 to 12 inches in thickness. It is friable and has granular structure. Below the surface layer is a grayish-brown to light grayish brown silt loam subsurface layer. It is 2 to 6 inches thick.

The upper 8 to 24 inches of the subsoil is a black clay or silty clay. This layer is commonly referred to as a "claypan". It is extremely compact, massive and almost impervious to water. Upon drying, the clay shrinks and cracks, forming irregular sizes and shapes of soil material. It contains scattered, black, indurated and nearly round concretion-like material from one-eighth to one-fourth of an inch in diameter.

The middle part of the subsoil is a dark grayish-brown heavy silty clay loam, four to eight inches in thickness.

The lower subsoil is a light grayish-brown silt loam, having a zone of lime enrichment. It is friable and has weak coarse prismatic structure to massive. The underlying material is a light grayish-yellow silt loam, being at a depth of about six feet.

These soils are not well suited to cultivated crops, owing to their poor drainage, to their rather thin surface layer over the "claypan" subsoil. All of the areas are subject to periodic inundation. Some corn, wheat, and grain sorghum are grown in the better drained areas but the yields are generally low. Crop production is extremely low during prolonged dry periods because the surface layer is too thin to hold much moisture and the underlying "claypan" subsoil has little available moisture to plants.

Hastings series: The Hastings series consists of deep, well drained, silty soils on uplands. They have formed in Peoria loess. They are mostly nearly level and very gently sloping. They are extensive in the Udic Ustoll area of central Nebraska and northern Kansas.

The surface layer is a very dark grayish-brown silt loam 10 to 20 inches in thickness. It typically has granular structure.

The upper part of the subsoil is a dark grayish-brown silty clay loam about 12 inches in thickness. It has well developed blocky and prismatic structure. A thin film of dark-brown colloidal material covers most of the structural aggregates. Although this layer contains appreciable clay, it does not have the density of a true claypan.

The middle part of the subsoil is a friable grayish-brown to grayish-yellow silt loam. Its color becomes gradually lighter with depth. It attains a thickness of three feet at places but is generally much thinner.

The lower part of the subsoil is similar to the above layer except that it has a zone of carbonate enrichment. The underlying material at a depth of four to six feet is unaltered or only slightly altered Peoria loess.

Hastings soils are transitional in most of their features between Holdrege and Crete soils and differ chiefly in the amount of clay in the upper subsoil. Included in mapping the Hastings soils were small areas of Holder soils. Hastings soils have more clay in the upper part of the subsoil than Holdrege soils and less clay than Crete soils in the upper part of the subsoil. Hastings soils also have a better developed prismatic structure than Holdrege or Crete soils. Hastings soils have thinner dark surface layers than Hall soils which occur on stream terraces instead of uplands.

During seasons of normal or above normal precipitation, these soils are productive of cultivated crops. Practically all of the area is cultivated to corn, grain sorghum, and wheat.

Holdrege series: The Holdrege series consists of deep, well drained soils on uplands. They have formed in Peoria loess. They are mostly nearly level to moderately sloping. These are among the most extensive soils in the central Nebraska and adjoining parts of Kansas.

The surface layer is a silt loam from 7 to 14 inches in thickness.

The subsoil is a dark, grayish-brown light silty clay loam. Many of the structural aggregates have a thin coating of colloidal organic material. Below 24 to 30 inches is a light grayish-brown to yellowish-brown light silty clay loam or silt loam that contains less clay than the above horizon.

The underlying silt loam material at a depth of three to six feet has a zone of lime enrichment. In this zone, most of the carbonates are disseminated but a part are in thin coatings on the surfaces of structure aggregates. Lime concretions are rare or absent.

Holdrege soils have a thicker surface layer, have a light silty clay loam subsoil and have carbonates at greater depth than Coly soils. Holdrege soils have a thinner dark surface layer than Hall soils which are on stream terraces. Holdrege soils have less clay in the subsoil than Hastings soils.

Soils of the Holdrege series are among the most productive in the area. Most of the acreage is cultivated. Corn, grain sorghum and wheat are the principal crops grown.

Geary series: The Geary series consists of deep, well drained soils on uplands. They have formed in light reddish-brown loess of the Loveland formation. They are gently sloping to steep. These soils are mainly in the central and southern part of Nebraska and north-central Kansas.

On the smoother and less eroded areas, which are relatively inextensive, the surface layer is a very dark grayish-brown silt loam, 10 to 12 inches thick.

The upper part of the subsoil is a dark grayish-brown silt loam or silty clay loam with a faint reddish tinge about 10 inches thick. It is slightly more clay than the surface layer but remains friable. Below this is a pale reddish-brown silt loam. The underlying material at a depth of three to four feet has a pronounced zone of lime enrichment.

In their more extensive distribution, the Geary soils are severely eroded and the surface layer is less than 8 inches thick. In most of the eroded areas, outcrops of the Loveland formation are numerous and contrast sharply in reddish brown color compared to the surrounding darker soil material.

Geary soils differ from other soils in the area by having a reddish-colored subsoil and underlying material.

These soils usually occupy but a small part of the farms on which they occur. Some areas are in native grasses and other areas are in cultivated crops. Wheat, grain sorghum and alfalfa are the principal crops.

Hord series: The Hord series consists of deep, well drained, silty soils on colluvial fans at the bases of slopes on gently sloping terraces and on nearly level stream valleys. They have formed in local silty colluvial and alluvial sediments composed mainly of dark surface layer material from the adjoining uplands. They are extensive on stream terraces in central Nebraska.

The surface layer is a very dark grayish-brown or black silt loam about three feet in thickness, becoming slightly lighter in color downward. It is friable. Below the surface layer is a brown or grayish brown silt lime. The profile may contain thin strata of slightly darker and lighter colors in the lower part.

Hord soils have uniform thicker dark surface layers than other soils of the area.

These soils are well suited for crop production.

Hobbs series: The Hobbs series consists of deep, well drained silty soils on narrow bottomlands. They have formed in silty alluvial and colluvial sediments. They are subject to occasional flooding. These soils comprise many of the small floodplains of central Nebraska and northern Kansas.

The surface layer is a stratified grayish-brown to very dark grayish-brown silt loam. These stratified silty layers continue to a depth of six feet or more.

Hobbs soils have a more stratified profile and are subject to more flooding than other soils in the watershed. Included with the Hobbs soils on slightly higher areas were small areas of Hord soils. In the Beaver creek watershed these two soils were so intricately associated, and their agronomic and profile characteristics so similar, that separation was impractical. Those soils mapped as soil number 13 comprise the narrow drainageways and include areas on colluvial footslopes while soils included in number 14 are on the wider floodplains.

This soil is well suited for cultivation, meadowland or pasture land. Flooding is generally of short duration. Good yields of corn and sorghum are obtained.

Many areas occur as narrow band-like areas on footslopes and valleys. In many areas they comprise only a small part of the farms in which they occur. The larger and more accessible areas are cultivated while many of the smaller tracts remain in pasture land.

Hobbs silt loam, calcareous variant: These Hobbs soils are only a few feet above stream beds and are subject to overflow during periods of high water.

They are similar to the Hobbs silt loam except that lime is normally present throughout the soil. These soils in places contain more clay in the lower horizons and may be moderately well drained or somewhat poorly drained during wet seasons.

This soil is suited and used for cultivation and pasture land. Good yields are obtained.

Extent of Various Soils and Soil Features in the Watershed Areas

Several tables are presented to show the extent of the various soils in the several watersheds and some of the soil characteristics that were derived from the soil survey of 1939.

Table 5 shows the percentage of each soil type in each of the four large watersheds. Table 6 shows the same information for the 24 small watersheds and eight pasture plots except that the values of percent of area in each soil type are presented in terms of topsoil depths. It should be pointed out that the soil survey of the small watersheds and plots were made in somewhat more detail than the survey of the large watersheds. Therefore, the soil information for the small areas may not agree exactly with the information as shown on the maps in the folio.

Table 7 presents information on the extent of erosion, land use capabilities, and topsoil depths for each of the watersheds and plots.

Land capability expresses the suitability of land for use without damage. The classification used is the one developed by the Soil Conservation Service. The eight land-capability classes, distinguished according to the risk of land damage or difficulty of land use, used with the 1939 soil survey are defined as follows:

Land suitable for cultivation and other uses

Class I - Very good land for cultivation. Nearly level and productive; not subject to erosion. Needs only ordinary good farming methods.

Class II - Good land for cultivation. Mostly gently sloping, not more than moderately subject to erosion. Some rather wet. Can be farmed safely with easily applied practices.

Table 5.—Soil type in each large watershed, from 1939 soil survey

Soil number and type	Watershed			
	W-3	W-5	W-8	W-11
	Percent	Percent	Percent	Percent
1 - Colby silt loam	10.3	9.9	8.5	8.0
2 - Colby-Nuckolls complex	0	1.1	2.6	1.5
3 - Crete silt loam	11.0	0	2.6	1.6
4 - Fillmore silty clay loam	0	0	T	T
5 - Hastings silt loam	43.7	67.4	44.7	54.6
6 - Hastings silty clay loam	10.9	2.8	7.1	4.9
7 - Holdrege silt loam	9.4	5.4	14.5	10.7
8 - Nuckolls silt loam	1.9	0	1.0	.6
9 - Nuckolls silty clay loam	2.3	2.4	3.3	2.0
10 - Nuckolls-Holdrege silt loams	.2	0	.2	.1
11 - Nuckolls-Holdrege silty clay loams	.7	4.2	1.0	.6
12 - Hall silt loam	0	0	0	.4
13 - Judson silt loam	9.6	6.8	6.5	6.0
14 - Judson-Wabash silt loams	0	0	5.3	7.4
15 - Lamoure silt loam	0	0	2.7	1.6

Table 6.—oil types and depths of topsoil in each small watershed and pasture plot, from 1939 soil survey 1/

Watershed or plot number	S o i l t y p e s											
	Hastings silt loam			Hastings silty clay loam			Holdroge silt loam			Colby silt loam		
	0-12 inches		5-8 inches	1-3 inches		0-1 inches	0-12 inches		5-8 inches	1-3 inches		0-1 inches
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
1-H	47	53	53	0	0	0	0	0	0	0	0	0
2-H	53	27	27	0	0	0	0	0	20	0	0	0
3-H	0	33	33	31	6	0	0	0	0	0	0	0
4-H	0	65	65	20	7	0	0	0	0	0	0	0
5-H	63	24	24	0	13	0	0	0	0	6	0	0
6-H	63	22	22	2	23	0	0	0	0	0	0	0
7-H	61	12	12	4	0	0	0	0	0	0	0	0
8-H	60	40	40	0	0	0	0	0	0	0	0	0
9-H	61	28	28	10	1	0	0	0	0	0	0	0
10-H	75	9	9	5	11	0	0	0	0	0	0	0
11-H	24	36	36	39	0	1	0	0	0	0	0	0
12-H	26	24	24	36	14	0	0	0	0	0	0	0
13-H	0	0	0	54	40	6	0	0	0	0	0	0
14-H	0	0	0	100	0	0	0	0	0	0	0	0
15-H	0	44	44	0	48	0	0	0	0	0	0	0
16-H	36	0	0	41	23	0	0	0	0	0	0	0
17-H	0	40	40	7	21	0	0	0	0	0	0	0
18-H	79	21	21	0	0	0	0	0	0	0	0	0
19-H	0	5	5	52	28	15	0	0	0	0	0	0
20-H	4	27	27	16	38	0	13	0	0	0	0	0
21-H	15	31	31	0	54	0	0	0	0	0	0	0
22-H	69	0	0	31	0	0	0	0	0	0	0	0
23-H	0	53	53	26	21	0	0	0	0	0	0	0
24-H	25	0	0	26	20	20	0	0	0	0	0	0
51-H	0	19	19	0	0	0	81	0	0	0	0	0
52-H	0	28	28	0	0	0	72	0	0	0	0	0
53-H	0	35	35	0	0	0	65	0	0	0	0	0
54-H	0	28	28	0	0	0	72	0	0	0	0	0
55-H	60	40	40	0	0	0	0	0	0	0	0	0
56-H	35	65	65	0	0	0	0	0	0	0	0	0
57-H	67	33	33	0	0	0	0	0	0	0	0	0
58-H	51	49	49	0	0	0	0	0	0	0	0	0

1/ Depths of topsoils were determined by borings in each watershed area.

Table 7.—Erosion, land use capability (LUC), and topsoil classes for each watershed, from 1939 soil survey

	Percent of area in each erosion class--			Percent of area in each LUC class--				Percent of area in each topsoil depth class 1/--			
	1	2 ^{2/}	3	II	III	IV	VI	a	b	c	d
W-3	53	30	17	26	44	10	20	15	61	24	
W-5	45	40	15	14	60	17	9	18	62	20	
W-8	45	40	15	20	51	14	15	20	58	22	
W-11	49	41	10	20	57	11	12	23	60	17	
1-H	100	0	0	4	55	37	4	47	53	0	0
2-H	100	0	0	8	63	19	10	53	47	0	0
3-H	0	100	0	1	51	31	17	0	33	31	36
4-H	0	100	0	1	70	20	9	0	65	20	15
5-H	0	100	0	2	82	5	11	63	24	0	13
6-H	26	74	0	6	75	12	7	63	22	2	13
7-H	30	70	0	11	57	15	17	61	12	4	23
8-H	0	100	0	16	84	0	0	60	40	0	0
9-H	100	0	0	14	76	7	3	61	28	10	1
10-H	100	0	0	2	93	5	0	75	9	5	11
11-H	9	91	0	16	59	20	5	24	36	39	1
12-H	0	100	0	4	56	29	11	26	24	36	14
13-H	0	100	0	0	33	57	10	0	0	54	46
14-H	73	22	0	0	41	46	13	0	0	100	0
15-H	0	100	0	0	56	37	7	0	44	0	56
16-H	62	38	0	0	73	23	4	36	0	41	23
17-H	40	60	0	0	35	43	22	0	40	7	53
18-H	100	0	0	4	89	7	0	79	21	0	0
19-H	90	10	0	0	41	52	7	0	5	52	43
20-H	0	100	0	0	62	29	9	17	27	18	38
21-H	0	100	0	0	67	25	8	15	31	0	54
22-H	0	100	0	4	86	10	0	69	0	31	0
23-H	70	30	0	0	80	17	3	0	53	26	21
24-H	0	100	0	0	68	18	14	25	0	26	49
51-H	100	0	0					81	19	0	0
52-H	100	0	0					72	28	0	0
53-H	100	0	0					65	35	0	0
54-H	100	0	0					72	28	0	0
55-H	100	0	0					60	40	0	0
56-H	100	0	0					35	65	0	0
57-H	100	0	0					67	33	0	0
58-H	100	0	0					51	49	0	0

1/ a = over 8 inches or to veil; b = 5 to 8 inches; c = 3 to 5 inches; and d = less than 3 inches.

2/ includes class 22 erosion.

Class III - Moderately good land for cultivation. Mostly moderately sloping. Some too wet or too dry. Can be farmed safely with practical conservation measures, carefully applied. Usually a combination of two or more measures is needed.

Class IV - Fairly good land, suitable for occasional cultivation. Generally strongly sloping; often shallow or very sandy. Often dry climate.

Land not suitable for cultivation

Class V - Land very well suited for grazing or forestry. Requires good range or woodland management.

Class VI - Land well suited for grazing or forestry. Steeply sloping land, stony or shallow soil, eroded land, droughty land, or wet land. Requires careful management.

Class VII - Land fairly well suited for grazing or forestry. Severely limited in use by such factors as very steep slope, shallow or droughty soil, wetness, severe erosion, or excessive salinity. Requires very careful management.

Class VIII - Land not suitable for cultivation, grazing, or forestry. May be useful for wildlife, recreation, or protection of water supplies.

THE BASIC HYDROLOGIC DATA

Procedures were established at the initiation of the project for systematic collection, reduction, and compilation of the hydrologic data. The procedures were followed quite consistently throughout the life of the project. There were, of course, some improvements in measuring equipment and procedures as time progressed. Also there were times when lack of man-power or funds forced cut-backs in the kinds or amounts of data collected.

The data collection programs established included those on: (1) precipitation, (2) runoff, (3) farming practices and cover conditions, (4) soil moisture, and (5) sedimentation. In addition, a central meteorological station was maintained throughout the period. The scope and extent of each of the data collection efforts along with samples or summaries of the data collected are briefly outlined hereafter.

Much of the more detailed hydrologic data, as well as copies of maps and channel data, are available in the files of the Hydrologic Data Laboratory. Information on the specific types of data available may be obtained by writing:

Hydrologic Data Laboratory
Agricultural Research Service
Beltsville, Maryland 20705

Precipitation

Precipitation amounts were measured by Weather Bureau (non-recording) standard gages and Ferguson-type automatic weighing-recording gages. The gages were exposed and operated in accordance with guides set out by the Weather Bureau ^{1/} and the ARS ^{2/}. Each gage was mounted on a permanent base in the center of a woven wire enclosure as shown in figure 16.

Rainfall intensities were measured by the Ferguson-type gages having a depth of nine inches of rainfall and generally operating on scales of 1 inch equals 0.67 inch of rainfall. Intensities were usually computed for each time interval during which rain fell at a uniform rate.

In the winter, when the precipitation could be expected to fall as snow, the receivers and measuring tubes were removed from the standard gages. The catch in the overflow can was then melted and measured in the measuring tube. The recording gages were prepared for the winter season by removal of the funnels and charging the recorder bucket with various antifreezing solutions.

The standard gages were read at 8:00 A.M. by local farmers who were given careful instructions and were quite conscientious. The recording gages were inspected and serviced annually and the field observers were well trained. The reduction of data from the charts was done or supervised by professionals. It is considered that the precipitation data are of excellent quality, except for the winter months when the precipitation fell as snow. The gages of the network were not shielded.

^{1/} U.S. Weather Bureau. Instructions for climatological observers. Cir. B. 70 pp. various editions.

^{2/} Agricultural Research Service. Field manual for research in agricultural hydrology, U.S. Dept. Agr. Handbook 224, 1962.

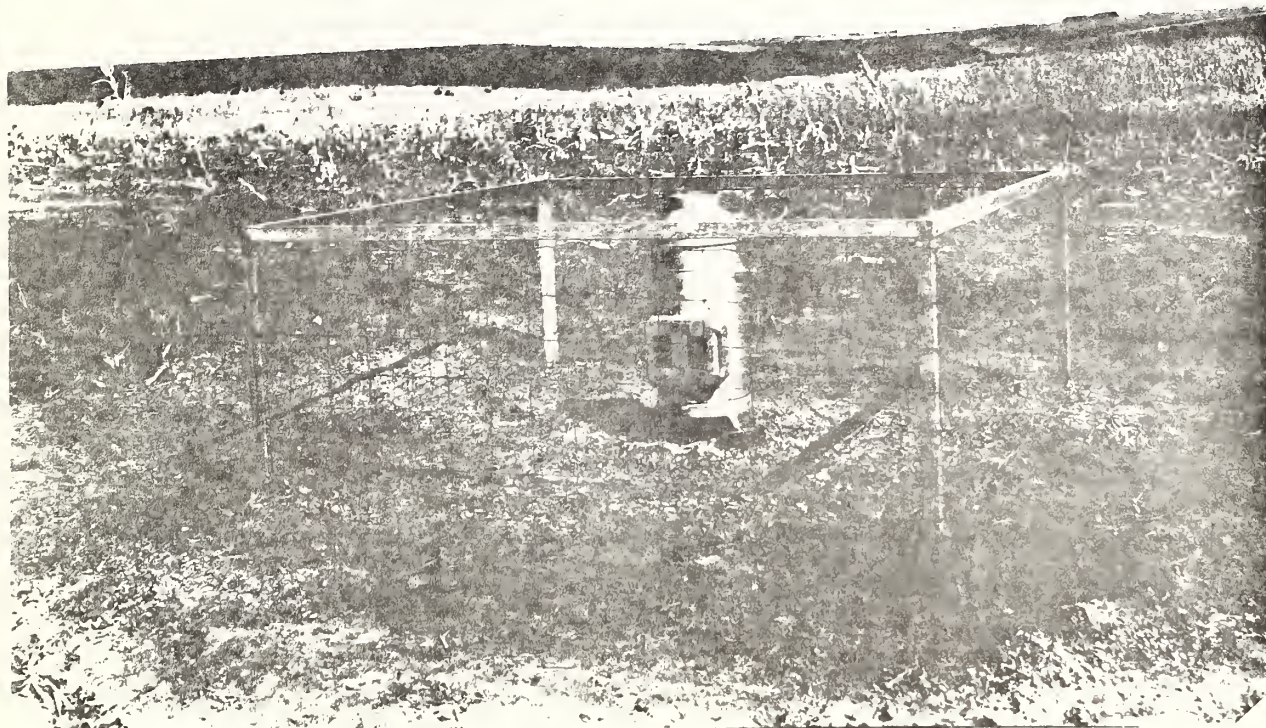


Figure 16.—A typical installation of an automatic weighing-recording rain gage.

Precipitation Data

The precipitation network as installed in 1938-1939 included 30 standard gages and 14 recording gages. The standard gages of the network were discontinued in 1948 and, as resources and program emphasis changed, various changes were made in the recording gage network.

Beginning with the year of 1962, only four of the recording gages of the network were operated for the entire year. These gages were the Meteorologic Station gage, D31R, D45R, and G42R. The balance of the gages were discontinued during the months of January, February, March, November, and December.

All recording gages at which records were collected, at any time, are shown on the maps of figures 1, 2, and 17. The period of record of each of the recording gages is shown in table 9. The availability of precipitation data for any watershed or plot may be determined by reference to the figures and table.

The series of tables in Appendix A showing "Monthly Precipitation and Runoff" and the precipitation data presented in "Selected Run-off Events" gives a general picture of the scope and type of precipitation data collected.

At the Hydrologic Data Lab (see page 69) detailed data is available for both the standard and recording gages for the periods indicated above. For the standard gages the data is in terms of daily catches, from 8:00 A.M. to 8:00 A.M. For the recording gages the data is in terms of amounts or intensities for each time interval for which precipitation fell at a uniform rate.

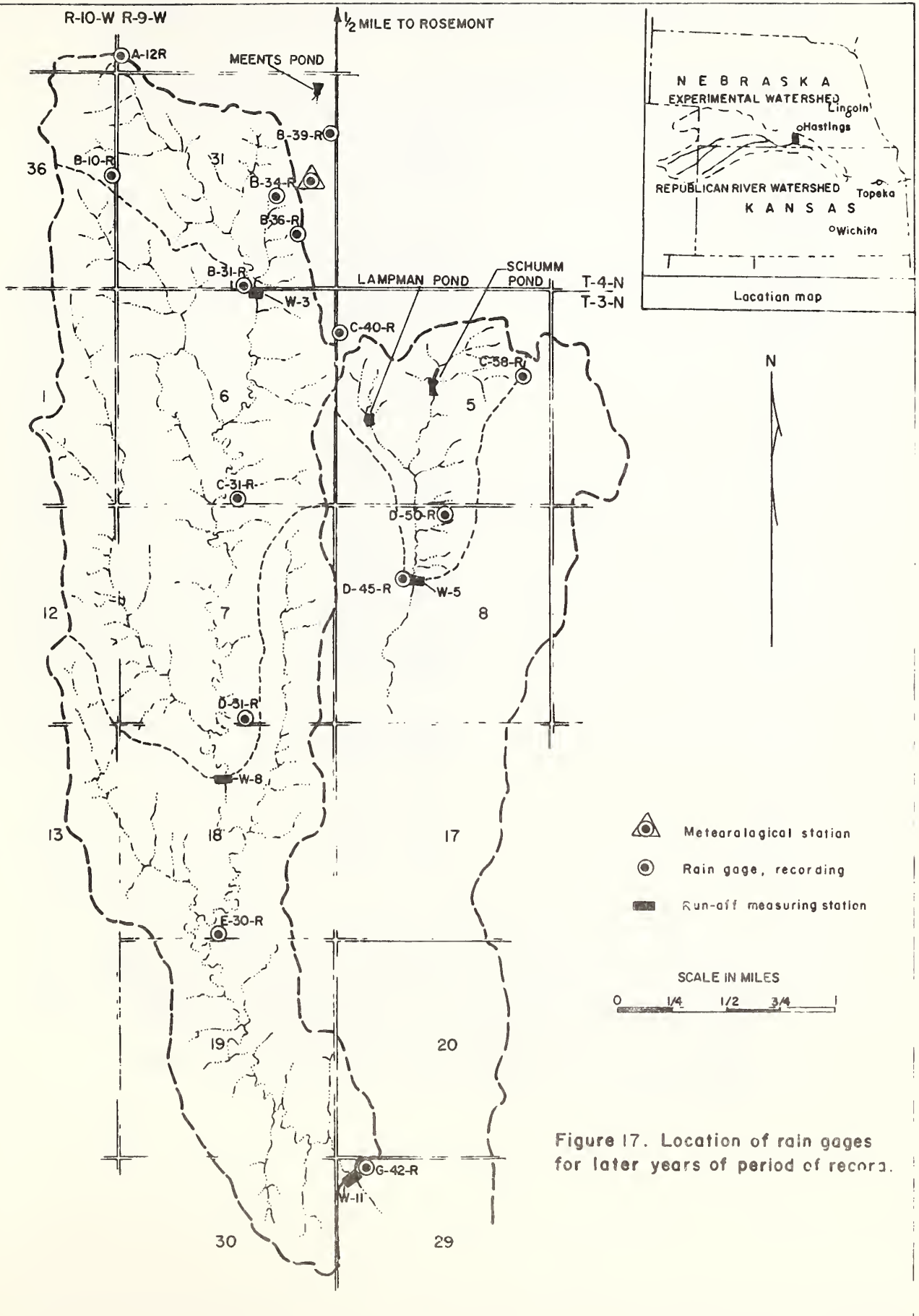


Figure 17. Location of rain gages for later years of period of record.

Table 9 .—Periods of record for all recording rain gages

Rain gage	Period of record, inclusive dates <u>1/</u> <u>2/</u>
Met. station <u>3/</u>	1942—1967
A12R	1962—1967
A31R	1938—1962
B10R	1941—1942, 1955—1967
B23R	1941—1955
B25R	1941—1954
B28R	1939—1954
B31R	1963—1967
B32R	1939—1962
B33R	1939—1962
B34R	1964—1967
B36R	1939—1967
B38R	1939—1955
B39R	1963—1967
C23R	1939—1954
C24R	1939—1954
C31R	1938—1967
C40R	1963—1967
C43R	1941—1954
C45R	1939—1962
C58R	1961—1967
D31R	1938—1967
D45R	1939—1967
D50R	1955—1962
E30R	1938—1967
G42R	1938—1967

1/ Beginning and ending years may be part years.

2/ Beginning with 1962 only the Met. Station, D31R, D45R, and G42R were operated for the entire year. Other gages were discontinued for the months of January, February, March, November, and December.

3/ The site of the Meteorological Station was at B38R until 1942.

Runoff

Two types of runoff measuring stations were used at the project: 1) precalibrated units and 2) those requiring field calibration by means of current-meter measurements of discharge.

The precalibrated installations were the H-type flumes developed by the SCS. Made of sheet metal, they consisted of converging vertical side-walls cut back on a slope to give a trapezoidal projection of the outlet. The H-type flume was calibrated in the hydraulic laboratories of SCS and its cooperators and was constructed and installed in the field with conditions as near as possible to those under which it was calibrated.

Two sizes of H-type flumes were in operation: the flume of three foot depth which can gage a maximum capacity of 30 cfs and the flume of two foot depth which can gage a maximum capacity of 11 cfs.

The three foot flumes were used on the "four acre" watersheds. Inlet boxes were installed on all these flumes, except 1-, 2-, 18-, and 25-H, to prevent excessive pondage during high stages. Figure 18, of station 9-H, is typical of those installations.

The two foot flumes were installed on the eight pasture plots. Figure 19 shows a typical installation.

For the four large watersheds, broad crested concrete V-notch weirs with 1 on 3 side slopes were used to control the stage-discharge relationships for low flows, and stabilized channel banks served as control for the higher flows. Submergence gages were necessary because of the low slope of the streams. Each station was rated by current-meter measurements made in accordance with US Geological Survey practices. Figures 20, 21, 22, and 23 show the four gaging stations.

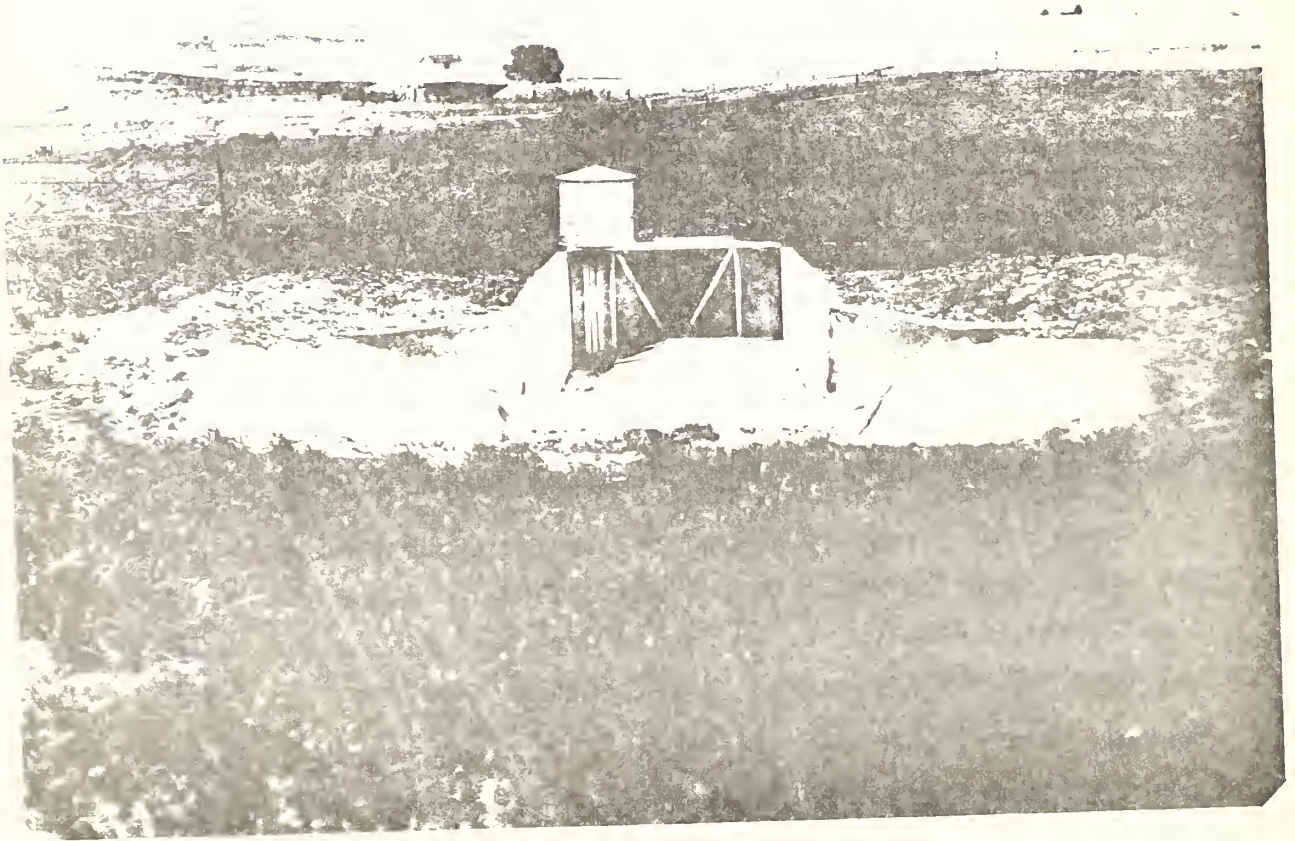


Figure 18.—The three-foot H flume at watershed 9-H, a typical installation.

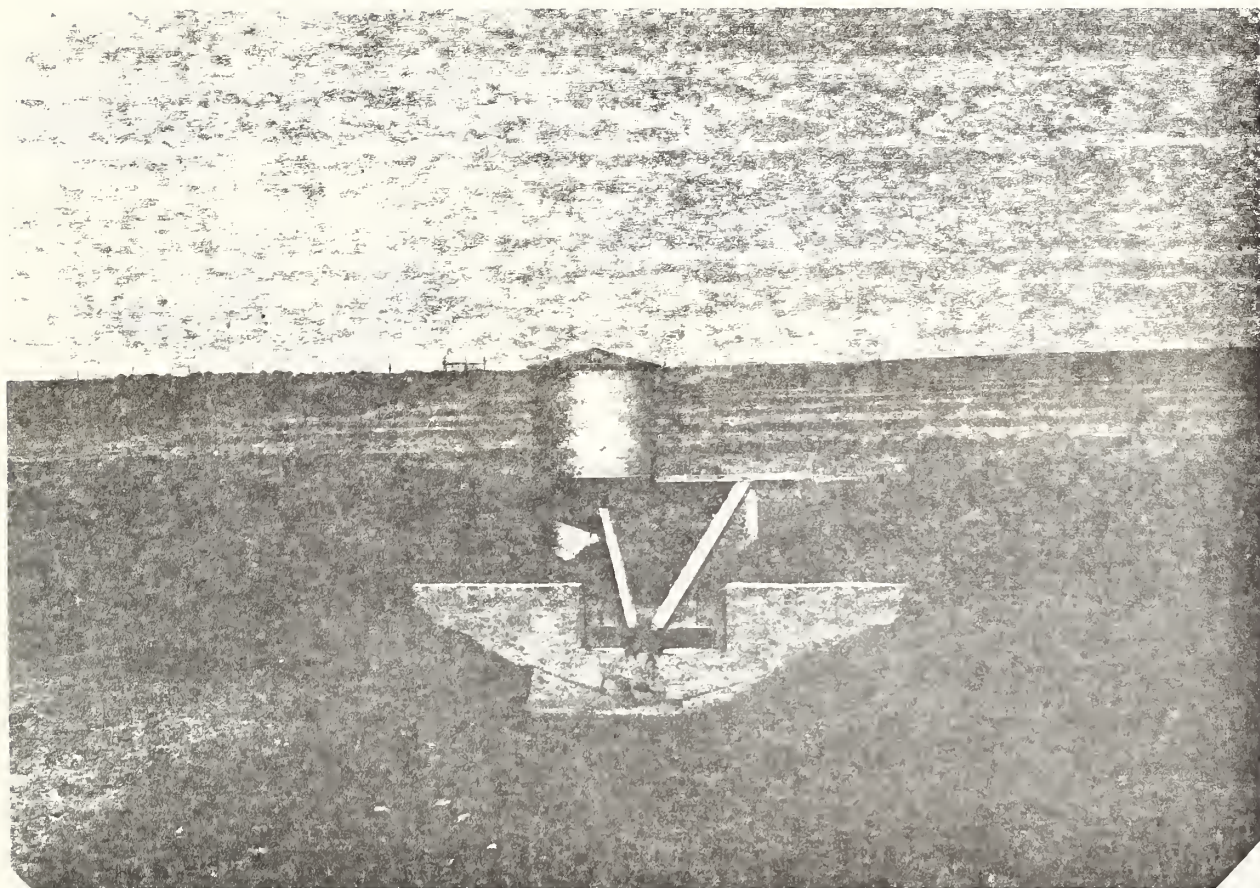


Figure 19.—A two-foot H flume on one of the furrowed pasture plots.

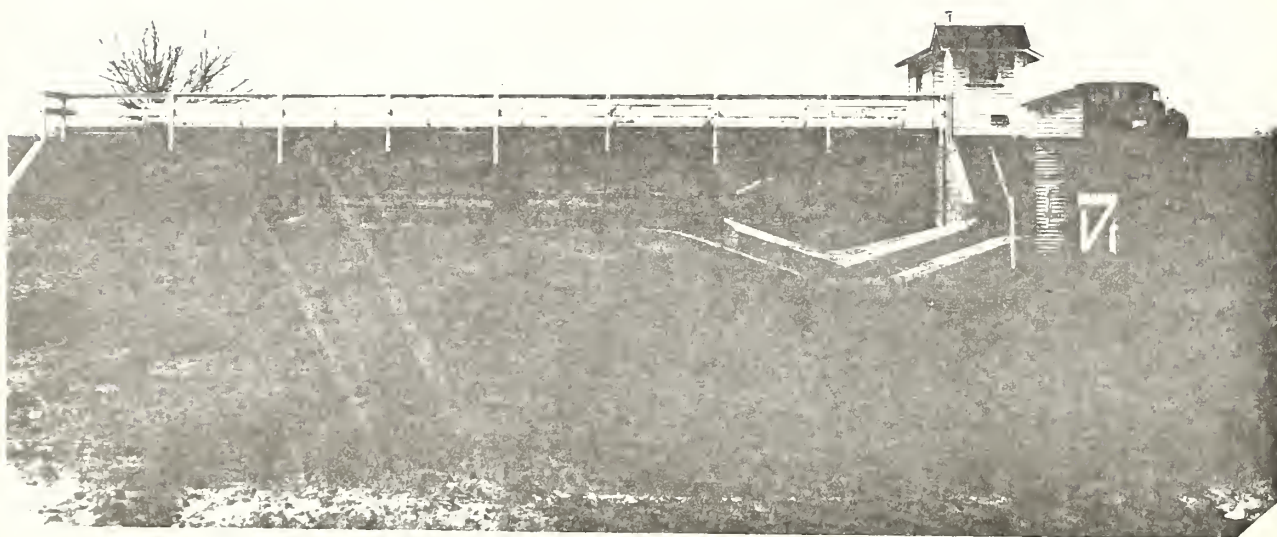


Figure 20.—Gaging station W-3, looking upstream.

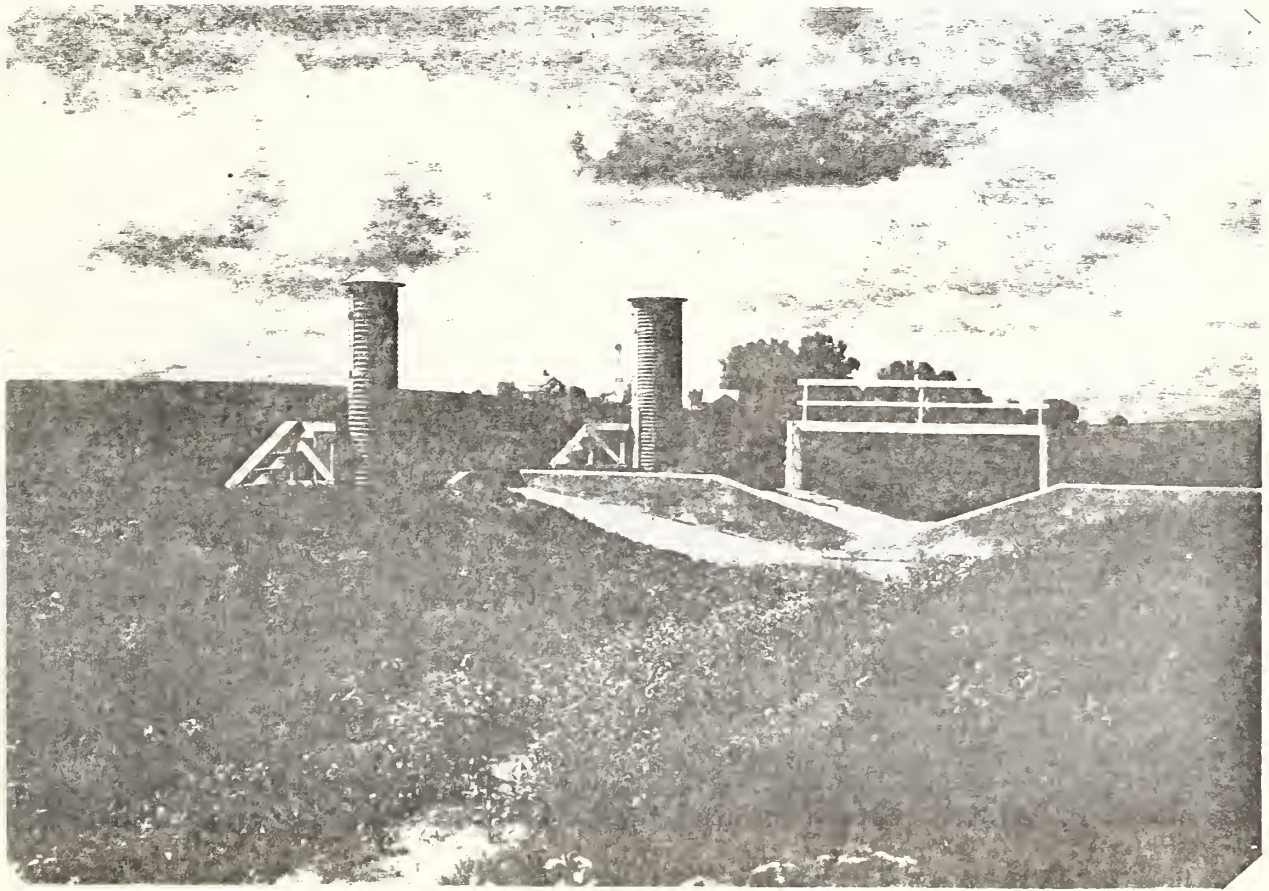


Figure 21.—Gaging station W-5, looking upstream.



Figure 22.--Gaging station W-8, looking downstream

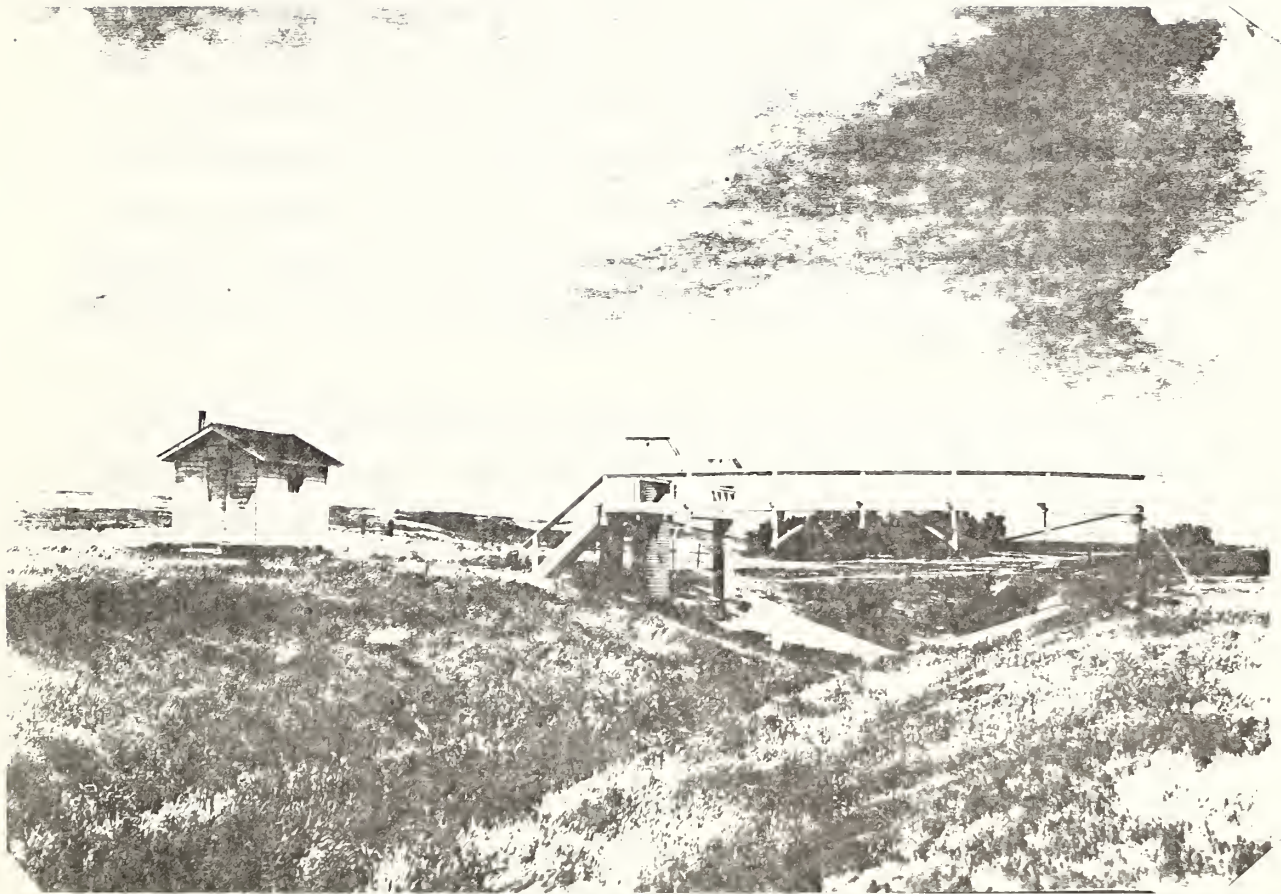


Figure 23.—Gaging station W-11, looking downstream.

Priez FW-1 waterstage recorders were used at all runoff stations. Standard practices were followed in reducing the chart data on time and stage to time, discharge rate, and accumulated discharge. Records of stage were corrected for any improper settings in time, for instrument irregularities, and for any gage height errors due to datum shifts, intake stoppage, and paper expansion or contraction. All of these possible sources of error, except datum shifts, were checked by the station personnel when charts were changed. Annually, or oftener, elevations at each station were checked with a surveyor's level.

Corrected gage heights were transferred from recorder charts to computation sheets by tabulating the time and stage for each change in direction (slope) of the stage graph, with additional points necessary to define the hydrograph and to compute the runoff amounts. Discharge tables derived from laboratory calibrations or current-meter measurements gave the discharge in cubic feet per second and inches per hour for each tabulated stage. The discharge for each time interval was averaged with that for the preceding time; this average discharge for the time interval was converted to the amount of runoff in inches for the time interval; and these runoff increments were then accumulated to give the mass runoff.

The records from the H-type flumes are considered to be very good to excellent except when silt or ice accumulated in the approach or throat sections. Flume inlet boxes eliminated need for pondage corrections. For many records, estimates of the lower stages were made when silt deposits had formed on the flume floors. Estimates of runoff amounts for single storms were necessary in some cases to complete monthly and annual totals.

The records from the V-notch field rated weirs are considered, overall, to range from fair to good in quality. Those at stations W-3 and W-5 are somewhat better than those at W-8 and W-11.

Runoff Data

The periods of record of runoff for all runoff stations are shown in table 10. The beginning and ending dates are inclusive, however, they may represent part years.

Appendix A presents a summary of monthly precipitation and runoff, a listing of the annual maximum flows, and detailed hydrologic information on selected runoff events. The material in this Appendix will give a general impression of the runoff data that was collected.

The detailed runoff data necessary to construct hydrographs for substantially all flows is available from the Hydrologic Data Laboratory (see page 69).

There are a few cases where instrument failure may have resulted in loss of the record. Estimates satisfactory for monthly or annual summaries were made by the field personnel.

Table 10.--Periods of record for all runoff stations

Watershed or plot numbers	Period of record, inclusive dates ^{1/}
W-3	1938-1967
W-5	1939-1967
W-8	1939-1967
W-11	1939-1967
1-H	1939-1967
2-H	1939-1954, 1958-1967
3-H	1939-1954, 1958-1967
4-H	1939-1954, 1958-1967
5-H	1939-1956, 1958-1967
6-H	1939-1956, 1958-1967
7-H	1939-1956, 1958-1967
8-H	1939-1954, 1958-1967
9-H	1939-1954
10-H	1939-1954
11-H	1939-1954
12-H	1939-1954
13-H	1939-1954
14-H	1939-1954
15-H	1939-1954
16-H	1939-1954
17-H	1939-1954
18-H	1939-1955, 1957-1967
19-H	1941-1954
20-H	1941-1954
21-H	1941-1954
22-H	1941-1954, 1962-1967
23-H	1941-1954, 1962-1967
24-H	1941-1954
25-H	1963-1967
51-H	1939-1954
52-H	1939-1945, 1947-1954
53-H	1939-1945, 1947-1954
54-H	1939-1945, 1947-1954
55-H	1939-1945, 1947-1954
56-H	1939-1954
57-H	1939-1945, 1947-1954
58-H	1939-1945, 1947-1954

^{1/} Beginning and ending years may be part years.

Farming Practices and Cover Conditions

About 70 percent of the general area of which the Central Great Plains Experimental Watershed was a part is under cultivation; about 25 percent is in permanent native-grass pastures and meadows; and the remainder is in miscellaneous uses, such as roads and farmsteads. The pastures and meadows occupy the lands along the drainageways and rough lands too steep for cultivation. The crops and type of farming characteristic of the area should be one in which large fields and farms prevail, but the topography is such that in practice small fields must be farmed. This condition has not led to a highly productive and prosperous agricultural economy.

General Farming Practices

In the early years of the project, a common crop sequence on the cultivated lands of the watershed was corn; oats, barley, or fallow; and winter wheat. In subsequent years grain sorghum (milo) gradually replaced corn, and the need for oats as a feed grain for horses ceased to exist. In the 1960's, corn, oats, and barley had become minor crops; an optimum rotation was believed to be wheat, fallow, and sorghum.

The weather and available soil moisture in this climatic belt is always a determining factor in whether or not a planned rotation or sequence of crops is followed. When moisture conditions are favorable, it is common practice to ignore the rotation and plant the crop that may be expected to produce the largest return.

The ground for corn, commonly grain stubble, was usually disked during the last half of April. The land then lay idle until sometime in May or the middle of June when the corn was planted with a lister planter in rows 42 inches apart. The corn was planted about one inch deep in the bottom of a furrow about five inches deep. The soil from the furrow then formed a ridge between the rows of corn. Cultivations, usually three, gradually leveled the soil from the ridge to the furrow. Some of the corn was used for silage and fodder, but the greater part was left standing in the field and husked in the late fall. The stalks then remained standing in the field until the following spring when the land was planted to oats or barley, fallowed, or, if the moisture conditions were favorable, replanted to corn.

The grain sorghums (milo) were planted in June and were planted and cultivated in much the same manner as corn. They reached maturity and were harvested in the late fall, usually after the middle of September. A minor amount of sorghum was grown for forage, being planted and harvested as hay or temporary pasture crop.

The ground for oats and barley, usually cornstalk ground, was double disked in the spring as soon as the ground became dry and suitable for working during late March or early April. The grain was immediately planted. The oats and barley, which mature in late June or early July, were, in the early years of the project, cut with a binder, shocked, and threshed. The straw was saved for bedding or feed for livestock, or was burned. In later years, the grain was harvested in one operation with a combine. This latter method resulted in more of the straw being left on the land.

Winter wheat was planted in the latter part of September or first part of October on fallow ground or on ground that had been in small grain in the spring and summer. Land that had been in small grain was prepared for wheat by plowing as soon after harvest as possible and by subsequent disking and harrowing to provide a smooth, firm seedbed and to control weeds. Wheat matures in the later part of June or the first part of July. It was harvested in the same manner as other grains. The stubble ordinarily remained on the field until the next spring. Russian thistles and other weeds often made rank growth after harvest if moisture conditions were favorable.

The meadows were of native grass consisting mostly of blue grama and side-oats grama. These grasses seldom grow over one foot high. Only one crop of hay was taken from the meadow each year, and in drought years many meadows were not cut. The time of cutting depended on the season and ranged from July to November.

The pastures were also of native grass, consisting mostly of buffalo grass and blue grama. In drought years the pastures were overgrazed and deteriorated badly. In the spring of the year, an annual grass known locally as June grass made a lush cover for a few weeks. The perennial grasses seldom were allowed to reach a height of over two or three inches.

Land Use and Treatment on the Watersheds

The land use and cropping patterns and the treatments for the small watersheds and pasture plots are discussed under the previously presented topic "Program of the Station" and shown in tables 1, 2, and 3. The land use and treatment of the large watersheds W-3, -5, -8, and -11 were not controlled by the station personnel, with the exception of the conservation treatments applied to the watershed of W-5 during later years. However, even in this latter case, the station did not have complete control.

Land use and treatment data for large watersheds: The owners and operators of the lands of watersheds W-3, -8, and -11 farmed the lands of these areas with the practices prevalent in the general community. Similar practices were followed by the owners and operators of the lands of watershed W-5 until 1947, when a concerted effort was made to apply conservation practices to that watershed.

Except for the years of 1947 through 1954 on W-8 and -11 and the years 1947 through 1949 on W-5, a survey was made annually to determine the land use and crop in each of the large watersheds. This information is presented in tables 11 through 14, a table for each watershed. The surveys were made during the growing season. All the cultivated crops grown are planted and mature in the same calendar year, except wheat. This crop is planted in the fall and matures the following summer. Thus, for example, the area of wheat in watershed W-3 in November of 1943 is 69 acres as listed for 1944, rather than the 135 acres as listed for 1943. The information listed in tables 11 through 14 is available at the Hydrologic Data Center.

Conservation treatment on watershed W-5: After a determination had been made in 1946 that there were no significant differences in the runoff potentials of watersheds W-3 and W-5, steps were taken to establish conservation practices on the lands of watershed W-5.

The major portion of the conservation practices and measures were installed during the period of 1947 through 1950, thus any hydrologic effects would presumably be evidenced after that period. The principal practices were the establishment of graded terraces and grassed waterways, contour farming, and the restoration of grasses on steeply sloping land. Tests were made of the need for commercial fertilizers, but no record is available of the amount of fertilizer applied and it is probable that very little fertilizer was used.

Table 11.—Land use, in acres, for watershed W-3 for period of record

Year	Corn	Sorghum 1/	Oats and barley 2/	Winter wheat 3/	Fallow	Alfalfa & clover 4/	Pasture	Meadow	Sudan 5/	Farm yards	Roads	Brome grass
1938	150	10	74	143	0	7	70	8	4	12	3	0
39	110	22	74	168	2	0	74	8	8	12	3	0
1940	131	43	104	61	23	0	74	8	21	12	3	1
41	151	23	101	89	6	3	74	8	12	11	3	0
42	112	10	85	127	33	3	74	8	14	12	3	0
43	198	7	39	135	0	3	74	8	2	12	3	0
44	209	0	56	69	11	5	79	8	29	12	3	0
1945	174	0	63	102	0	23	79	9	12	12	3	4
46	140	0	80	144	0	4	78	8	13	11	3	0
47	49	0	227	76	0	3	79	8	15	11	3	10
48	75	29	76	158	23	3	79	8	6	12	3	9
49	65	0	149	99	43	3	79	8	11	11	3	10
1950	149	2	29	151	17	8	76	10	10	12	3	14
51	132	28	90	92	18	4	76	10	10	12	3	6
52	114	0	89	146	2	4	76	10	10	12	3	15
53	222	23	66	0	36	8	76	10	10	12	3	15
54	123	56	46	82	20	28	76	10	10	12	3	15
1955	104	32	43	80	74	9	77	10	23	13	3	13
56	62	61	26	137	62	6	90	10	11	13	3	0
57	0	184	31	79	44	16	90	10	11	13	3	0
58	76	55	8	45	162	8	90	10	11	13	3	0
59	46	80	0	173	47	6	89	10	14	13	3	0
1960	107	100	0	70	63	13	80	10	19	9	10	0
61	47	96	0	79	132	2	85	10	12	8	10	0
62	41	108	4	126	80	2	84	10	8	8	10	0
63	18	143	2	88	102	0	88	10	13	7	10	0
64	16	131	0	108	84	0	88	10	26	8	10	0
1965	18	84	0	91	134	11	88	11	27	7	10	0
66	17	78	0	63	99	30	91	68	28	7	10	0
67	0	104	0	108	53	26	97	64	9	10	10	0

1/ Sorghum (milo) in rows.

2/ Includes small amounts of barley in a few years.

3/ Includes a small amount of rye in a few years.

4/ Includes a small amount of sweet clover in a few years.

5/ Includes millet and drilled sorghum.

Table 12.--Land use, in acres, for watershed W-5 for period of record

Year	Corn	Sorghum 1/	Oats and barley 2/	Winter wheat 3/	Fallow	Alfalfa & clover 4/	Pasture	Meadow	Sudan 5/	Farm yards	Roads	Brome grass
1939	145	35	25	47	49	5	38	43	10	11	3	0
1940	75	73	85	5	72	5	38	43	1	11	3	0
41	85	16	16	114	69	0	45	43	9	11	3	0
42	152	8	40	86	26	0	38	43	4	11	3	0
43	207	8	30	61	0	0	37	44	10	11	3	0
44	151	9	43	22	20	0	45	42	0	11	3	65
1945	155	4	67	70	0	0	39	42	0	11	3	20
46	129	0	31	70	0	4	42	97	0	11	3	24
Information not recorded for 1947 through 1949												
1950	138	9	13	50	0	55	37	43	4	11	3	48
51	118	0	17	65	35	34	37	43	0	11	3	48
52	82	10	49	89	4	33	37	43	2	11	3	48
53	93	11	48	40	34	42	37	40	3	11	3	49
54	82	21	56	69	12	30	39	42	0	11	3	46
1955	133	45	8	37	12	35	35	42	0	11	3	50
56	60	60	8	60	41	39	37	40	2	11	3	50
57	24	102	4	23	96	36	41	40	2	11	3	29
58	39	56	14	77	38	44	58	69	2	11	3	0
59	23	69	9	74	48	29	54	87	4	11	3	0
1960	30	92	0	75	36	38	50	68	4	13	5	0
61	51	88	0	38	52	47	50	68	0	12	5	0
62	36	57	8	64	54	46	54	76	2	9	5	0
63	22	78	16	84	16	50	73	56	2	9	5	0
64	0	75	5	60	68	58	76	56	0	8	5	0
1965	9	101	0	48	51	52	76	56	5	8	5	0
66	0	105	0	48	51	54	76	55	9	8	5	0
67	Information not recorded											

1/ Sorghum (milo) in rows.

2/ Includes small amounts of barley in a few years.

3/ Includes a small amount of rye in a few years.

4/ Includes a small amount of sweet clover in a few years.

5/ Includes millet and drilled sorghum.

Table 13.—Land use, in acres, for watershed W-8 for period of record

Year	Corn	Sorghum ^{1/}	Oats and barley ^{2/}	Winter wheat ^{3/}	Fallow	Alfalfa & clover ^{4/}	Pasture	Meadow	Sudan ^{5/}	Farm yards	Roads	Brome grass
1938	584	45	139	690	39	17	387	93	25	21	46	0
39	490	115	251	461	125	6	370	113	89	23	43	0
1940	602	201	368	139	111	0	376	113	110	23	43	0
41	480	183	264	366	132	16	396	114	69	23	43	0
42	582	110	260	413	58	46	390	90	71	23	43	0
43	718	45	289	393	16	58	372	89	40	23	43	0
44	770	60	316	297	14	48	341	94	80	23	43	0
1945	807	6	210	395	0	71	376	94	57	23	43	4
46	679	0	228	508	2	66	361	112	57	23	43	7
Information not recorded for period of 1947 through 1954												
1955	430	196	92	418	158	190	373	80	48	41	47	13
56	402	281	66	355	217	156	437	56	28	41	47	0
57	148	540	60	238	292	200	437	55	28	41	47	0
58	232	319	18	291	396	226	437	55	24	41	47	0
59	209	344	23	506	276	124	432	55	29	41	47	0
1960	210	612	0	283	316	81	422	66	32	24	40	0
61	134	388	76	347	454	122	426	54	22	23	40	0
62	127	456	82	361	328	163	440	40	26	23	40	0
63	122	572	38	292	281	182	444	40	53	22	40	0
64	30	554	13	351	353	172	442	40	68	23	40	0
1965	18	436	6	364	472	188	442	40	57	23	40	0
66	17	436	9	420	342	201	445	123	30	23	40	0
67	0	584	0	438	292	167	438	104	0	23	40	0

^{1/} Sorghum (milo) in rows.^{2/} Includes small amounts of barley in a few years.^{3/} Includes a small amount of rye in a few years.^{4/} Includes a small amount of sweet clover in a few years.^{5/} Includes millet and drilled sorghum.

Table 14.—Land use, in acres, for watershed W-11 for period of record

Year	Corn	Sorghum 1/	Oats and barley 2/	Winter wheat 3/	Fallow	Alfalfa & clover 4/	Pasture	Meadow	Sudan 5/	Farm yards	Roads	Brome grass
1938	777	86	228	1253	136	21	722	106	51	47	63	0
39	774	160	326	964	178	7	684	138	137	59	63	0
1940	883	482	630	163	213	2	691	138	166	59	63	0
41	718	264	531	612	231	16	760	138	98	59	63	0
42	947	137	372	727	190	51	689	98	157	59	63	0
43	1129	75	534	648	32	67	690	99	94	59	63	0
44	1298	105	495	507	30	64	641	104	124	59	63	0
1945	1194	58	377	743	0	100	689	104	94	59	63	9
46	1112	0	328	899	8	92	665	132	98	70	66	20
Information not recorded for period of 1947 through 1954.												
1955	650	509	241	549	249	267	723	90	57	71	66	18
56	474	604	114	654	401	212	777	66	51	71	66	0
57	191	910	70	471	597	225	777	65	47	71	66	0
58	264	672	29	630	605	288	774	65	26	71	66	0
59	320	675	23	736	528	172	772	94	33	71	66	0
1960	242	1043	18	530	507	148	734	116	43	45	64	0
61	169	759	78	572	702	202	732	128	40	44	64	0
62	127	766	88	624	613	279	742	105	38	44	64	0
63	122	976	38	584	456	287	748	115	56	44	64	0
64	36	1009	13	555	517	309	744	120	79	44	64	0
1965	23	815	6	451	840	329	794	64	60	44	64	0
66	19	609	9	760	671	316	800	148	50	44	64	0
67	0	942	0	733	454	278	769	174	32	44	64	0

1/ Sorghum (milo) in rows.

2/ Includes small amounts of barley in a few years.

3/ Includes a small amount of rye in a few years.

4/ Includes a small amount of sweet clover in a few years.

5/ Includes millet and drilled sorghum.

Reference has previously been made to the fact that though agreements for the establishment of conservation plans were obtained from all land owners or operators in 1946, some of the land changed ownership in 1947. The new owner did not choose to cooperate in applying the recommended conservation measures to his land and thus the measures were never established on 80 acres of land in the north-eastern part of the watershed.

The conservation measures that could be considered effective after 1950 included 45,000 feet of the planned 69,000 feet of graded terraces. The balance of the planned terraces were on the lands of the new owner mentioned above and were never constructed. The maximum length of terraces was reached in the mid-1950's when 48,000 feet had been built. The runoff from about 170 acres of land was controlled by the terraces. These lands were also farmed on the contour.

The area of perennial grasses and alfalfa was increased as shown in table 12. In the first five years of record about 76 percent of the land was used for annual cultivated crops and 20 percent was in native grass pastures and meadows and alfalfa. In the last five years of record the area of annual cultivated crops had been reduced to about 52 percent and the area of land in perennial grasses and alfalfa had been increased to about 44 percent. In table 12 the areas of increased pasture and meadow land shown were largely in brome-grass.

Data on Condition of Crops and Cover

At the time of initiation of the project, plans were made to assess and record the condition of major crops and pastures bi-monthly. The plans were not always followed, partly because of lack of personnel and partly because the small changes that occurred from one inspection to the next made it appear unnecessary.

The inspections included a judgment estimate of the soil moisture condition and the condition of each of several crops. The recorded information for the bi-monthly inspection is shown in table 15. The footnotes to the table set out the terms used to describe conditions.

Times of planting and harvesting are not shown in the table, but this may be inferred from the height information. The data of table 15, for the period through 1945, are available in the files of the Hydrologic Data Laboratory.

Table 15.--General condition of watershed soil and cover^{1/}

Date	Soil moisture condition	Cover condition and height					
		Corn	Sorghum	Oats and barley	Wheat	Pasture	Meadow
1	2	3	4	5	6	7	8
<u>1939</u>							
Jan. 1	5	a30	a2	a4	p2	pl	g2
15	5	a30	a2	a4	p2	pl	g2
Feb. 1	5	a30	a2	a4	p2	pl	g2
15	5	a30	a2	a4	p2	pl	g2
Mar. 1	5	a30	a2	a4	p2	pl	g2
15	5	a30	a2	a4	p2	pl	g2
Apr. 1	5	a30	a2	b0	p3	pl	g2
15	4	b0	a2	x1	p3	pl	g3
May 1	4	b0	a2	f3	p4	pl	g4
15	4	b0	a2	f6	p7	pl	g5
June 1	4	b1	b0	pl0	pl2	pl	g6
15	4	f10	x1	pl2	pl4	pl	g7
July 1	4	f23	f5	a4	p4	pl	g7
15	4	f30	f12	a4	a4	pl	g6
Aug. 1	5	f36	f24	a4	a4	pl	g6
15	5	p36	p30	a4	a4	pl	g6
Sept. 1	5	p36	p30	a4	a4	pl	g6
15	5	p36	p30	a4	a4	pl	g6
Oct. 1	5	p36	a2	a4	a4	pl	g6
15	5	p36	a2	a4	a4	pl	g6
Nov. 1	5	p30	a2	a4	a4	pl	g5
15	5	p30	a2	a4	a4	pl	g4
Dec. 1	5	p30	a2	a4	a4	pl	g4
15	5	p30	a2	a4	a4	pl	g4

^{1/} See explanation of column headings and symbols at end of table.

Table 15.--General condition of watershed soil and cover^{1/}.--Continued

Date	Soil moisture condition	Cover condition and height					
		Corn	Sorghum	Oats and barley	Wheat	Pasture	Meadow
1	2	3	4	5	6	7	8
<u>1940</u>							
Jan. 1	5	a30	a3	a4	p1	p1	g2
15	5	a28	a3	a4	p1	p1	g2
Feb. 1	5	a28	a3	a4	p1	p1	f2
15	5	a26	a3	a4	p1	p1	f2
Mar. 1	5	a24	a3	a4	p1	p1	f2
15	5	a22	a3	a4	p1	p1	f2
Apr. 1	5	a20	a3	b0	p1	p1	f2
22	3	b0	a3	g2	p2	g1	f3
May 1	3	b0	a3	f3	p5	f2	f4
16	2	b0	a3	p6	p7	f3	f5
May 31	3	g1	b0	p10	p11	f3	f6
June 15	2	g5	g2	p14	p12	f3	f6
July 1	4	f24	f6	a4	p12	f3	f6
15	5	p36	p16	a4	a4	p3	f5
Aug. 1	5	p36	p28	a4	a4	p2	f5
15	5	p36	p30	a4	a4	p2	f5
Sept. 3	5	p36	p30	a4	a4	p1	f5
17	5	p36	p36	a4	a4	p1	f5
Oct. 2	3	p36	p36	a4	a4	p1	f5
15	3	p36	p36	a4	a4	p1	f5
Nov. 1	4	p30	p36	a4	a4	p1	f5
18	2	p30	p4	a4	a4	p1	f5
Dec. 2	3	p27	p4	a4	a4	p1	f5
17	2	p27	p4	a4	a4	p1	f5

^{1/} See explanation of column headings and symbols at end of table.

Table 15.--General condition of watershed soil and cover^{1/} .--Continued

Date	Soil moisture condition	Cover condition and height					
		Corn	Sorghum	Oats and barley	Wheat	Pasture	Meadow
1	2	3	4	5	6	7	8
<u>1941</u>							
Jan. 2	2	a24	a4	a4	f2	p1	f5
16	2	a24	a4	a4	f2	p1	f5
Feb. 3	2	a24	a4	a4	f2	p1	f5
17	2	a24	a4	a4	f1	p1	f5
28	2	a24	a4	a4	f1	p1	f4
Mar. 15	2	a24	a4	a4	f1	p1	f4
Apr. 1	3	a24	a4	b0	f1	p1	f3
16	3	a24	a4	x1	f3	f1	f2
May 2	3	b0	a4	g2	f6	f2	f3
15	3	b0	a4	g10	f14	f3	f7
June 5	2	g6	b0	g20	f20	f6	f7
20	3	g10	f6	g24	f22	f6	f7
July 8	4	g36	f30	a6	a6	p3	f8
21	4	f60	f36	a6	a6	p2	f9
Aug. 6	4	f68	f48	a6	a6	p2	f9
22	3	f72	f60	a6	b0	p2	f10
Sept. 5	3	g72	g72	a6	b0	p2	f12
20	3	g72	g72	a6	b0	p2	f3
Oct. 4	3	g72	g72	a6	g1	p2	f3
20	3	g60	a4	a6	g3	p2	f3
Nov. 5	3	g48	a4	a6	g4	p2	f3
19	2	x48	a4	a6	g4	p2	f3
Dec. 5	2	x44	a4	a6	g3	p2	f3
22	3	x44	a4	a6	g3	p2	f3

^{1/} See explanation of column headings and symbols at end of table.

Table 15.--General condition of watershed soil and cover^{1/}.--Continued

Date	Soil moisture condition	Cover condition and height					
		Corn	Sorghum	Oats and barley	Wheat	Pasture	Meadow
1	2	3	4	5	6	7	8
<u>1942</u>							
Jan. 5	2	a36	a4	a4	g2	f1	g5
20	2	a36	a4	a4	g2	f1	g5
Feb. 5	2	a36	a4	a4	g2	f1	g5
20	2	a36	a4	a4	g2	f1	g5
Mar. 5	2	a36	a4	a4	g2	f1	g4
20	2	a36	a4	a4	g2	f1	g4
Apr. 6	3	a36	a4	b0	g3	g1	g3
20	3	b0	a4	x2	g6	g1	g3
May 5	3	b0	a4	g3	g12	g2	g3
20	3	b0	a4	g8	g10	g3	g6
June 6	2	g2	b0	g18	g18	g5	g10
20	2	g8	g4	g30	g26	g5	g12
July 7	3	g24	g30	a6	a6	g3	g8
21	3	f60	g36	a6	a6	g2	g9
Aug. 5	3	f66	g48	a6	a6	g2	g9
20	2	f72	g60	a6	b0	g2	g10
Sept. 5	2	g72	g72	a6	b0	g2	g12
20	3	g72	g72	a6	b0	g2	g3
Oct. 5	3	g72	g72	a6	g1	g2	g3
20	3	g60	a4	a6	g3	g2	g3
Nov. 5	3	a48	a4	a6	g4	g2	g3
20	3	a48	a4	a6	g4	g2	g3
Dec. 5	3	a44	a4	a6	g3	g2	g3
22	3	a44	a4	a6	g3	g2	g3

^{1/} See explanation of column headings and symbols at end of table.

Table 15.--General condition of watershed soil and cover^{1/}.--Continued

Date	Soil moisture condition	Cover condition and height					
		Corn	Sorghum	Oats and barley	Wheat	Pasture	Meadow
1	2	3	4	5	6	7	8
<u>1943</u>							
Jan. 5	2	a27	xx	a4	p2	f2	g4
20	2	a27	xx	a4	p2	f2	g4
Feb. 5	1	a27	xx	a4	p2	f2	g4
22	2	a27	xx	a4	p2	f2	g4
Mar. 5	2	a27	xx	a4	p2	f2	g4
22	3	a24	xx	a4	p2	f2	g4
Apr. 5	3	a24	xx	b0	f3	f2	g4
20	2	a24	xx	g1	f4	f3	g4
May 5	3	b0	xx	g5	g8	f3	g5
20	3	b0	xx	g8	g13	f3	e6
June 4	3	b0	xx	e16	e24	g4	e7
19	1	x3	xx	e22	e28	g5	e8
July 5	2	g20	xx	e22	e30	g6	e10
20	3	e48	xx	a5	a7	g4	e12
Aug. 5	3	e60	xx	a5	a7	g4	e12
20	4	g68	xx	a5	b0	f3	e12
Sept. 6	5	g72	xx	a5	b0	f3	g4
20	5	g72	xx	a5	b0	f2	g4
Oct. 5	5	g72	xx	a5	b0	f2	g4
20	4	g72	xx	a5	b0	f2	g4
Nov. 5	5	a65	xx	a5	b0	f2	g4
20	5	a65	xx	a5	b0	f2	g4
Dec. 6	5	a60	xx	a4	b0	f2	g4
20	5	a50	xx	a4	b0	f2	g4

^{1/} See explanation of column headings and symbols at end of table.

Table 15.--General condition of watershed soil and cover^{1/}.--Continued

Date	Soil moisture condition	Cover condition and height					
		Corn	Sorghum	Oats and barley	Wheat	Pasture	Meadow
1	2	3	4	5	6	7	8
<u>1944</u>							
Jan. 5	5	a36	xx	a4	p2	f2	g4
20	4	a27	xx	a4	p2	f2	g4
Feb. 5	4	a27	xx	a4	p2	f2	g4
22	4	a27	xx	a4	p2	f2	g4
Mar. 5	4	a27	xx	a4	p2	f2	g4
22	3	a24	xx	a4	p2	f2	g4
Apr. 5	3	a24	xx	b0	f3	f2	g4
20	2	a24	xx	b0	f3	f2	g4
May 5	2	b0	xx	p3	f4	f2	g4
29	2	b0	xx	f5	f6	f2	e5
June 6	3	f4	xx	f5	f10	g3	e8
19	2	g7	xx	p9	f18	g5	e3
July 6	3	g20	xx	f22	p20	g5	g6
24	4	g60	xx	a4	a4	g5	g8
Aug. 5	4	g72	xx	a4	a4	g5	g8
21	4	g84	xx	a4	a4	g3	g3
Sept. 5	2	g84	xx	a4	b0	g3	g4
20	3	g84	xx	a4	p2	g2	g4
Oct. 5	3	g84	xx	a4	p2	g3	g4
20	3	g84	xx	a4	f3	g3	g4
Nov. 9	4	a72	xx	a4	f2	f2	g4
20	4	a72	xx	a4	f2	f2	g4
Dec. 6	3	a72	xx	a4	f2	f2	g4
20	3	a60	xx	a4	f2	f2	g4

^{1/} See explanation of column headings and symbols at end of table.

Table 15.--General condition of watershed soil and cover^{1/}.--Continued

Date	Soil moisture condition	Cover condition and height					
		Corn	Sorghum	Oats and barley	Wheat	Pasture	Meadow
1	2	3	4	5	6	7	8
<u>1945</u>							
Jan. 5	5	a36	xx	a4	p2	f2	g3
20	4	a36	xx	a4	p2	f2	g3
Feb. 5	4	a36	xx	a4	p2	f2	g3
22	4	a36	xx	a4	p2	f2	g3
Mar. 5	4	a36	xx	a4	p2	f2	g3
21	3	a36	xx	b0	g2	f2	g3
Apr. 6	3	a36	xx	b0	g3	g2	g3
20	2	a36	xx	f2	g6	g2	g3
May 5	2	b0	xx	f4	g14	g4	g8
22	1	b0	xx	g8	g18	g5	g10
June 7	1	b0	xx	g14	g24	g6	g11
20	2	f5	xx	f24	f30	g8	g12
July 5	3	f12	xx	f28	f30	g9	g5
21	2	g28	xx	a4	a4	g5	g8
Aug. 6	3	g72	xx	a4	a4	g6	g10
20	4	g96	xx	a4	b0	g6	g12
Sept. 5	5	g96	xx	a4	b0	g5	g14
20	4	g96	xx	a4	b0	g3	g2
Oct. 5	3	g96	xx	a4	b0	f3	g3
20	3	g96	xx	a4	p3	f3	g3
Nov. 6	4	g96	xx	a4	f3	f3	g3
20	4	g96	xx	a4	f3	f3	g3
Dec. 5	4	a48	xx	a4	f3	f3	g3
20	4	a48	xx	a4	f3	f3	g3

^{1/} See explanation of column headings and symbols at end of table.

Table 15.--General condition of watershed soil and cover^{1/}.--Continued

Date	Soil moisture condition	Cover condition and height					
		Corn	Sorghum	Oats and barley	Wheat	Pasture	Meadow
1	2	3	4	5	6	7	8
<u>1954</u>							
May 1	2	b0	b0	f3	g6	g1	g1
15	3	b0	xx	f4	g8	g3	g3
June 1	2	b0	xx	g8	g10	e3	e4
15	2	g5	f2	g12	g18	e4	e7
July 1	3	g30	g6	f20	g24	g4	g7
15	4	f48	g18	ax	ax	f4	f6
Aug. 1	5	f54	g27	ax	xx	f4	p6
15	3	g60	g32	ax	xx	f4	f8
Sept. 1	3	g60	g32	xx	b0	g5	f12
15	3	g60	g32	xx	b0	g5	g3
Oct. 1	2	g60	g32	xx	g3	g5	g4
15	3	g60	g32	xx	g4	f5	g4
Nov. 1	3	ax	g32	xx	g4	f4	g4
<u>1955</u>							
May 15	5	b0	b0	p6	p6	p1	p1
June 1	5	b0	b0	p10	p10	p2	p4
15	5	e3	e2	f18	p16	f3	g8
July 1	3	e12	e4	f24	f18	g4	g12
Aug. 1	5	p60	xx	ax	ax	p2	f6
15	5	p72	f36	ax	ax	p3	f6
Sept. 1	5	p60	p36	xx	xx	p1	p1

^{1/} See explanation of column headings and symbols at end of table.

Table 15.--General condition of watershed soil and cover^{1/}.--Continued

Date	Soil moisture condition	Cover condition and height					
		Corn	Sorghum	Oats and barley	Wheat	Pasture	Meadow
1	2	3	4	5	6	7	8
<u>1956</u>							
Mar. 1	3	xx	xx	xx	f1	xx	xx
May 1	3	xx	xx	g4	g6	f2	g2
15	4	xx	xx	g6	f10	f3	xx
June 1	5	f2	b0	p7	f10	p3	f4
15	5	f6	p2	p8	f10	p3	f5
July 1	2	f20	f6	ax	ax	p4	f5
15	4	g42	g20	ax	xx	f4	f7
Aug. 1	5	f72	g27	ax	xx	f4	f8
15	4	f80	f32	ax	xx	p3	f8
Sept. 1	5	p80	f32	ax	b0	p2	f2
17	5	p80	f32	ax	b0	p2	f2
Oct. 1	5	p80	f32	xx	f3	p2	f2
15	5	ax	f32	xx	f3	p2	f2
Nov. 1	4	ax	f32	xx	f3	p2	f2
15	4	ax	ax	xx	f3	p2	f2
Nov. 30	5	ax	ax	xx	p3	p2	f2

^{1/} See explanation of column headings and symbols at end of table.

Table 15.--General condition of watershed soil and cover^{1/}.--Continued

Date	Soil moisture condition	Cover condition and height					
		Corn	Sorghum	Oats and barley	Wheat	Pasture	Meadow
1	2	3	4	5	6	7	8
<u>1957</u>							
Mar. 1	5	xx	xx	xx	pl	px	px
15	5	xx	xx	xx	pl	px	px
Apr. 1	3	xx	xx	xx	g2	fx	fx
15	2	xx	xx	xx	g2	fx	gx
May 1	2	xx	xx	g1	g4	g1	g2
15	1	b0	xx	g3	e12	g3	e3
June 1	2	b0	b0	e24	e36	e10	e12
15	1	f6	b0	e30	e48	e12	e14
July 1	2	g10	b0	e30	g48	e12	e16
15	3	g36	g12	e30	a12	e12	e16
Aug. 1	4	f72	f24	a8	a12	g8	g16
15	4	f84	g42	a8	a12	g6	g4
Sept. 1	2	f96	g48	a8	b0	g6	g4
15	3	f96	g48	a8	b0	f5	g4
Oct. 1	3	f96	g48	a8	g1	f4	g4
15	3	f96	g48	a8	g2	f4	g4
Nov. 1	3	f96	g48	a8	g2	f3	g4
15	3	a18	g48	a8	g3	f3	g4

^{1/} See explanation of column headings and symbols at end of table.

Table 15.--General condition of watershed soil and cover^{1/}.--Continued

Date	Soil moisture condition	Cover condition and height					
		Corn	Sorghum	Oats and barley	Wheat	Pasture	Meadow
1	2	3	4	5	6	7	8
<u>1958</u>							
Apr. 1	1	xx	xx	xx	e2	e1	e1
15	x	xx	xx	b0	e3	e1	e1
May 1	x	xx	xx	e2	e6	g2	g2
15	2	b0	b0	e12	e24	e4	e4
June 1	3	b0	b0	e24	e48	g6	e8
12	2	p6	p2	e30	e48	g6	g10
July 1	4	p12	p6	a10	e48	g6	g12
15	2	936	g12	a10	a12	gx	gx
Aug. 1	3	g60	g24	a10	a12	fx	g2
15	3	g84	g36	a10	a12	fx	g2
Sept. 1	3	g84	e48	a10	b0	fx	g2
Nov. 1	4	ax	ax	a10	g3	fx	g2
30	4	ax	ax	a10	g3	fx	g2
<u>1959</u>							
Mar. 1	4	xx	xx	xx	g1	fx	fx
Apr. 1	2	xx	xx	f1	g2	fx	gx
May 1	3	xx	xx	g5	e6	f2	e3
June 1	3	g2	g1	e36	e48	g5	g12
July 1	2	f24	g12	e30	e36	g10	e18
Aug. 1	3	f96	g48	a4	a6	f6	g20
15	5	f96	f48	a4	a6	p4	f2
Sept. 1	3	f84	f48	xx	b0	p4	f2
Oct. 1	1	f84	g48	xx	b0	f4	g2
Nov. 1	2	a12	a24	xx	e1	f3	g2
Dec. 1	4	a12	a24	xx	f1	f3	g2

^{1/} See explanation of column headings and symbols at end of table.

Table 15.--General condition of watershed soil and cover^{1/}.--Continued

Date	Soil moisture condition	Cover condition and height					
		Corn	Sorghum	Oats and barley	Wheat	Pasture	Meadow
1	2	3	4	5	6	7	8
<u>1960</u>							
May 1	3	xx	xx	xx	f2	g1	g1
15	x	b0	b0	xx	fx	ex	ex
June 1	3	g0	g0	g28	g36	g5	e7
15	2	g2	g2	f30	g36	x3	x7
July 1	2	g4	g3	f30	g36	g4	e8
Aug. 1	4	g84	g48	a5	a6	f3	g10
Sept. 1	5	f84	g48	a5	xx	f3	g2
Oct. 1	2	f84	g48	xx	g2	f3	g2
Nov. 1	3	a36	a24	xx	g3	f3	g3
Dec. 1	4	a36	a18	xx	g4	f2	g3

^{1/} See explanation of column headings and symbols at end of table.

Table 15.--General condition of watershed soil and cover^{1/}.--Continued

Date	Soil moisture condition	Cover condition and height					
		Corn	Sorghum	Oats and barley	Wheat	Pasture	Meadow
1	2	3	4	5	6	7	8
<u>1961</u>							
May 1	3	xx	xx	b0	g4	f1	f2
15	3	b0	b0	g4	g12	f2	f4
June 1	2	b0	b0	g12	e24	g4	f6
15	1	b0	b0	g24	e36	g6	e8
July 1	3	f12	f6	g30	e36	e6	e10
15	3	g36	g18	g30	a12	e6	e12
Aug. 1	4	g72	g36	ax	ax	f6	g14
15	3	g96	g48	xx	ax	f5	g16
Sept. 1	3	g96	g54	xx	b0	f5	g3
15	3	g96	g60	xx	b0	f5	g3
Oct. 1	3	g96	g60	xx	b0	f5	g3
15	3	g96	g60	xx	e2	f5	g3
Nov. 1	3	g96	a24	xx	e2	f4	g3
15	2	ax	a24	xx	e3	f4	g4
Dec. 1	3	ax	ax	xx	e3	f4	g4

^{1/} See explanation of column headings and symbols at end of table.

Table 15.--General condition of watershed soil and cover^{1/}.--Continued

Date	Soil moisture condition	Cover condition and height					
		Corn	Sorghum	Oats and barley	Wheat	Pasture	Meadow
1	2	3	4	5	6	7	8
<u>1962</u>							
Apr. 15	2	xx	xx	b0	f2	f1	f1
May 1	3	xx	xx	g3	g5	g3	g3
June 15	2	g12	g9	f30	f32	g6	f9
July 1	3	g42	g24	936	f32	g8	f10
Aug. 20	3	g96	g50	xx	xx	gx	gl8
Sept. 1	3	e96	g54	xx	b0	g4	g2
Oct. 1	3	e96	e54	xx	b0	g3	e3
Nov. 1	3	e96	a36	xx	e4	f3	e4
<u>1963</u>							
Apr. 1	4	xx	xx	xx	p2	p1	p1
May 1	3	xx	xx	p5	p7	f3	f4
June 1	4	p2	f1	p24	f27	p4	p6
July 1	3	g8	g4	p24	f28	p5	p7
Aug. 1	4	p78	f42	ax	ax	p5	pl2
Sept. 1	4	p84	f54	ax	xx	p5	pl2
Oct. 1	3	p84	g54	ax	b0	p5	p2
Nov. 1	3	ax	ax	xx	ex	fx	fx

^{1/} See explanation of column headings and symbols at end of table.

Table 15.--General condition of watershed soil and cover^{1/}.--Continued

Date	Soil moisture condition	Cover condition and height					
		Corn	Sorghum	Oats and barley	Wheat	Pasture	Meadow
1	2	3	4	5	6	7	8
<u>1964</u>							
June 1	4	p3	p1	p10	f24	p6	f12
July 1	3	g24	g12	p18	a6	f6	f11
Aug. 1	3	g60	e48	ax	a6	p3	f10
Sept. 1	2	g72	e54	ax	xx	f3	g3
Oct. 1	3	g72	e54	ax	e2	f2	g4
Nov. 1	4	ax	ax	ax	e3	p2	f4
<u>1965</u>							
Apr. 1	2	xx	xx	xx	e1	f1	g1
May 1	3	xx	xx	g1	f3	f3	g3
June 1	1	b0	b0	g4	g24	f4	g12
July 1	1	g20	g3	p25	p30	g4	g15
Aug. 2	3	g54	g42	ax	ax	g6	g24
Sept. 2	4	f120	g60	ax	b0	f5	g2
Oct. 1	2	f120	g60	xx	e2	f4	g3
Nov. 2	3	a36	a24	xx	e5	f3	g4

^{1/} See explanation of column headings and symbols at end of table.

Table 15.--General condition of watershed soil and cover^{1/}...--Continued

Date	Soil moisture condition	Cover condition and height					
		Corn	Sorghum	Oats and barley	Wheat	Pasture	Meadow
1	2	3	4	5	6	7	8
<u>1966</u>							
May 1	3	xx	xx	b0	g4	f2	g2
June 1	4	f2	b0	p5	f18	f4	f5
July 1	3	f20	f12	f16	g20	p4	f7
Aug. 1	3	g72	g40	ax	ax	p4	f9
Sept. 1	4	f72	g40	ax	b0	p4	f7
Oct. 1	5	f72	g40	xx	e1	p3	g3
<u>1967</u>							
Apr. 1	5	xx	xx	xx	f2	p1	f1
May 1	5	b0	b0	xx	g6	p1	f3
June 1	2	xx	b0	xx	f20	p3	f5
July 1	3	xx	g6	xx	g36	g7	e10
Aug. 1	3	xx	g12	xx	ax	g8	e16
Sept. 1	5	xx	p36	xx	b0	p6	g16
Oct. 1	3	xx	f36	xx	b0	f4	g4

^{1/} See explanation of column headings and symbols at end of table.

Table 15.--General condition of watershed soil and cover--Continued

1/ Explanation of column headings and entries:

Column 1 -- Year, month, and day.

Column 2 -- Soil moisture condition:

- 1) following a series of rains when the soil moisture deficiency is satisfied and seeps and wet spots are present.
- 2) too wet for satisfactory field work, but still capable of absorbing appreciable quantities of water.
- 3) sufficient moisture for good to fair plant growth, but still capable of absorbing appreciable quantities of water.
- 4) dry; crops suffering from lack of soil moisture; fields capable of absorbing large amounts of water.
- 5) very dry; crops withering and suffering from lack of moisture; soil in such condition that it will take up very large amounts of water quickly.

Columns 3 through 8 -- The entries in this column are made up of two parts: a letter and a figure. The letters indicate the following:

- x = information not available
- a = aftermath of the crop
- b = ground was bare due to cultivation
- p = poor
- f = fair
- g = good
- e = excellent

The figure indicates the average height of the crop, in inches. Here, also, x is used to indicate that the information is not available.

As an example, the first entry in column 3 means that the corn was in poor condition and 30 inches high, on the average.

Soil Moisture

Measurement of soil moisture for most of the period of record of the project was by the gravimetric method; that is, by removing samples of soil at specified depth increments, weighing, drying, and reweighing. Beginning in 1964, neutron-scattering equipment was used.

When gravimetric samples are processed, the basic computation results in a value representing the ratio (percent) of moisture to dry weight of the soil. To convert the ratio or percent to volume of water, a volume weight of 85 pounds per cubic foot of soil (dry weight) was used.

The quality of the soil moisture data is largely unknown. There are many opportunities for error in collecting and processing the gravimetric samples and the neutron-scattering equipment was new to its operators. However, the personnel who collected and processed the samples were conscientious individuals and it is probable that the quality of the data, over-all, would be fair to good.

Soil Moisture Data

Gravimetric soil moisture samples were taken at four sites in each of the 4-acre watersheds at the time of planting and again at the time of harvest. The sites were located by judgement to represent the various soils and slopes of the watershed. The first foot of soil was sampled in two increments of a half foot and the depth thereafter, through six feet, in one foot increments. Samples from the four sites were combined by depths.

Table 16 is a sample of the data collected by the gravimetric method on the 24 four-acre watersheds for the period of 1939 to 1954. The values in the last column of the table represent the total inches of water in the six-foot profile. It will be noted in this table that, though soil moisture measurements were taken only at the time of sowing and harvest, some soil moisture data is available for most months of the growing season.

Table 16.—Soil-moisture content, in percent of dry weight, at designated depths 1/, in watersheds 1-H through 24-H for 1943.

Soil-moisture content at depth, of —

Watershed and date	0-1/2 foot Percent	1/2-1 foot Percent	1-2 foot Percent	2-3 feet Percent	3-4 feet Percent	4-5 feet Percent	5-6 feet Percent	0-6 feet <u>2/</u> Inches
Watershed 1-H:								
May 3 -----	27.9	27.1	23.6	21.8	22.0	17.5	16.1	21.0
Oct. 13 -----	5.9	8.2	10.3	8.5	9.3	10.5	11.4	9.4
Watershed 2-H:								
May 3 -----	23.5	26.0	26.4	24.1	20.8	18.6	18.5	21.2
Oct. 13 -----	6.0	8.6	10.9	11.6	13.0	15.9	16.7	12.3
Watershed 3-H:								
Sept. 30 (1942) <u>3/</u> ----	25.0	24.6	24.2	23.4	21.4	19.3	17.6	21.4
July 13 -----	16.3	16.7	15.5	16.0	16.8	16.6	15.7	15.9
Watershed 4-H:								
May 20 -----	22.2	21.7	23.5	22.1	20.6	21.0	20.3	21.2
Oct. 25 -----	11.4	14.4	13.9	14.2	14.7	15.7	17.7	14.6
Watershed 5-H:								
Sept. 30 (1942) <u>3/</u> ----	24.5	26.0	26.1	22.7	20.3	17.9	17.7	21.2
June 12 -----	16.0	13.3	14.0	14.6	16.2	16.6	17.2	15.1
Watershed 6-H:								
April 13 -----	22.8	22.6	16.5	13.9	14.7	13.8	14.4	13.7
July 12 -----	12.1	12.3	12.9	15.1	15.6	14.6	15.6	14.1
Nov. 6 <u>3/</u> -----	6.2	8.4	9.0	10.3	10.2	10.0	10.9	9.4
Watershed 7-H:								
April 13 -----	22.1	21.0	17.0	13.0	15.6	15.3	12.9	15.3
July 10 -----	14.6	15.1	14.1	13.3	15.1	15.1	14.6	14.3
Nov. 6 <u>3/</u> -----	5.6	9.2	11.1	12.5	13.3	12.7	12.6	11.4

Table 16.—Soil-moisture content, in percent of dry weight, at designated depths 1/,
in watersheds 1-H through 24-H for 1943—Continued.

Soil-moisture content at depth, of —										
Watershed and date		0--1/2 foot	1/2--1 foot	1-2 feet	2-3 feet	3-4 feet	4-5 feet	5-6 feet	6-7 feet	8-10 feet
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Watershed 2-H:										
May 20	-----	15.5	20.3	18.0	17.2	18.8	17.8	15.6	17.2	17.2
Oct. 25	-----	9.0	10.6	10.8	10.3	9.3	11.4	11.0	10.3	10.3
Watershed 9-H:										
April 14	-----	25.1	25.5	22.6	19.6	19.2	15.3	15.4	19.2	19.2
July 18	-----	12.4	15.1	16.6	17.0	17.3	16.7	15.7	15.2	15.2
Nov. 12	5/-----	4.0	7.4	10.6	12.0	11.9	12.1	12.0	10.5	10.5
Watershed 10-H:										
April 17	4/-----	23.2	22.5	18.4	17.5	15.5	17.0	18.5	17.9	17.9
May 24	5/-----	21.0	23.3	23.2	18.8	17.0	17.8	18.8	19.3	19.3
July 13	4/-----	14.6	14.6	17.0	15.1	16.4	17.9	20.0	16.7	16.7
Oct. 22	5/-----	6.0	9.8	11.9	10.9	10.8	12.4	13.3	11.1	11.1
Watershed 11-H:										
April 17	4/-----	22.0	19.9	19.7	19.0	15.0	16.0	14.5	17.1	17.1
May 25	5/-----	21.5	21.1	17.0	16.2	17.5	15.8	16.7	17.1	17.1
July 13	4/-----	13.7	15.4	17.0	17.5	17.2	17.7	17.5	16.6	16.6
Oct. 22	5/-----	9.2	13.6	13.9	12.8	14.5	15.0	15.6	13.0	13.0
Watershed 12-H:										
May 21	-----	21.5	21.8	20.7	18.4	19.6	18.0	17.3	19.0	19.0
Oct. 18	-----	5.7	9.8	10.4	10.4	12.2	14.4	16.4	11.7	11.7
Watershed 13-H:										
Sept. 29	(1942) 8/-----	27.8	26.2	24.0	21.0	19.9	15.8	12.1	19.6	19.6
July 14	-----	13.5	11.6	12.8	12.9	14.3	14.4	11.7	12.9	12.9

Table 16.--Soil-moisture content, in percent of dry weight, at designated depths $1\frac{1}{2}$, in watersheds 1-H through 24-H for 1943--Continued.

Watershed and date		Soil-moisture content at depth, of —									
		0--1/2 foot Percent	1/2--1 foot Percent	1-2 foot Percent	2-3 foot Percent	3-4 foot Percent	4-5 foot Percent	5-6 feet Percent	6-8 feet Percent	8-10 feet Percent	
Watershed 14-H:											
April 14 $\frac{4}{5}$	-----	20.0	21.4	19.1	12.3	12.3	10.5	9.3	13.8	13.8	
May 22 $\frac{5}{6}$	-----	25.6	25.5	22.1	17.7	15.2	13.4	12.6	17.4	17.4	
July 14 $\frac{4}{5}$	-----	12.5	9.7	11.1	10.9	11.5	11.9	10.3	10.9	10.9	
Oct. 22 $\frac{5}{6}$	-----	7.6	11.4	10.2	9.2	10.3	9.9	9.9	9.6	9.6	
Watershed 15-H:											
April 14	-----	26.1	25.1	19.5	17.0	14.2	12.7	13.1	16.7	16.7	
July 16 $\frac{3}{4}$	-----	16.1	16.1	14.3	13.8	14.9	14.5	13.4	14.2	14.2	
Nov. 11 $\frac{3}{4}$	-----	4.4	8.4	9.9	9.0	10.1	10.4	11.1	9.4	9.4	
Watershed 16-H:											
Sept. 29 (1942) $\frac{3}{4}$	-----	25.0	24.6	22.5	21.4	20.2	19.5-18.5	18.6	20.6	20.6	
July 16	-----	19.3	17.3	15.2	14.4	15.3	17.5	18.9	16.4	16.4	
Watershed 17-H:											
May 21	-----	22.8	24.4	22.1	20.7	20.6	18.8	18.2	20.3	20.3	
Oct. 18	-----	6.7	9.1	9.5	9.5	10.8	11.9	11.8	10.0	10.0	
Watershed 18-H:											
May 1	-----	21.0	21.8	18.0	18.0	13.5	12.9	12.6	15.3	15.3	
Oct. 27	-----	6.7	7.0	7.8	8.9	9.3	12.0	13.0	9.5	9.5	
Watershed 19-H:											
May 21	-----	24.6	21.7	17.2	15.5	16.0	13.4	13.0	16.1	16.1	
Oct. 13	-----	6.7	9.3	8.6	9.5	10.6	12.0	11.2	9.8	9.8	
Watershed 20-H:											
April 13	-----	19.7	18.2	19.5	16.9	12.6	13.4	12.3	15.3	15.3	
July 14	-----	12.3	18.6	11.6	12.6	15.1	15.2	14.1	13.4	13.4	
Nov. 12 $\frac{3}{4}$	-----	7.3	9.1	8.4	7.8	8.3	8.6	8.7	8.3	8.3	

Table 16.—Soil-moisture content, in percent of dry weight, at designated depths 1/, in watersheds 1-H through 24-H for 1943—Continued.

Soil-moisture content at depth, of—

Watershed and date	0-1/2 foot Percent	1/2-1 foot Percent	1-2 feet Percent	2-3 feet Percent	3-4 feet Percent	4-5 feet Percent	5-6 feet Percent	6-8 feet <u>2/</u> Percent
Watershed 21-H:								
Sept. 29 (1942) <u>3/</u> ---	26.2	26.1	24.6	22.8	22.8	22.2	17.9	22.3
July 15 -----	20.9	21.0	19.2	17.6	20.0	20.8	20.7	19.5
Watershed 22-H:								
Sept. 29 (1942) <u>3/</u> ---	24.4	26.4	23.3	22.2	21.4	20.2	20.5	21.8
July 15 -----	14.0	12.4	14.6	15.4	17.0	17.3	18.7	15.7
Watershed 23-H:								
April 17 -----	22.8	21.5	19.6	16.7	16.2	16.9	17.7	17.3
July 13 -----	11.7	12.1	14.0	14.5	16.3	16.8	18.3	15.0
Nov. 10 <u>3/</u> -----	11.5	9.5	8.8	9.2	10.2	10.9	12.1	10.1
Watershed 24-H:								
May 21 -----	20.5	22.5	22.3	23.1	23.6	24.1	23.4	22.6
Oct. 23 -----	14.8	16.5	15.8	16.9	17.7	19.2	21.1	17.4

1/ 4 points sampled in duplicate and data averaged for each depth interval.

2/ Expressed in total inches of water contained in the profile from soil surface to 6-foot depth.

3/ Samples taken in 1942, at or near time of planting wheat; in 1943, at approximately last date wheat could have been planted

4/ Samples taken near the time of planting and harvesting of the oats strips.

5/ Samples taken near the time of planting and maturing of the corn strips.

Gravimetric samplings of soil moisture were also made on the eight pasture plots for the periods of 1940 to mid 1946. Samples were taken in half-foot increments for the first foot and in one-foot increments thereafter through the depth of four feet. The samples were taken twice a year, in the spring and in the fall. Table 17 is an example of the soil moisture data collected on the pasture plots. The foot notes to the table describe the manner in which the samples were taken from the pasture plots.

Beginning in 1942, a sampling procedure to obtain an estimate of the soil moisture status of the general watershed area was initiated. A sampling course of five points 100 feet apart on a cultivated field was laid out and duplicate samples to a depth of six feet were taken every month and to a depth of three feet every half month. A similar course in a meadow field was sampled. On figure 2 the cultivated field course lay at right angles to the slope, between watersheds 3-H and 4-H, and the meadow course lay immediately north of watershed 1-H. Table 18 presents an example of the type of data collected on these sampling courses. The sampling was continued through 1967.

In 1964, neutron-scattering equipment for measuring soil moisture was obtained. In this first year, tubes were installed only on watershed 4-H, permitting the personnel some time to gain experience in operating the equipment and to determine the most feasible pattern for distribution of the tubes over the watershed, the depths the tubes should penetrate, etc. The following year, 1965, tubes were installed on all the small watersheds on which studies were being carried out. These included 1-H through 8-H, 18-H, 22-H, 23-H, and 25-H. The tubes, three on each watershed, were located so as to sample each of three slope groups: 0 to 3 percent, 3 to 6 percent, and 6 to 10 percent. The collected data was of substantially the same type as that in table 16 except that all the values were in terms of volume of water rather than in terms of percent of water. Such data was collected for the period of 1965 through 1967 for the above mentioned watersheds.

Table 17.—Soil-moisture content, in percent of dry weight, at designated depths in pasture plots 51-H to 58-H for 1943.

Plot and date	Soil-moisture content at depth of —				
	0-1 foot	1-2 feet	2-3 feet	3-4 feet	0-4 feet
	Percent	Percent	Percent	Percent	Inches
51-H, unfurrowed: 2/					
May 3 -----	17.9	17.9	16.4	17.0	11.3
Oct. 13 -----	8.2	9.4	8.8	10.8	6.0
52-H, furrowed: 3/					
Midway between furrows:					
May 4 -----	15.1	22.1	19.3	14.3	11.8
Oct. 15 -----	7.3	10.2	10.2	10.0	6.2
3 feet uphill from furrows:					
May 4 -----	13.9	22.8	21.5	21.4	13.8
Oct. 15 -----	9.8	10.0	9.2	8.9	6.2
In furrows:					
May 4 -----	20.5	21.5	20.0	20.7	13.5
Oct. 15 -----	6.9	9.4	10.1	10.3	6.1
3 feet downhill from furrows:					
May 4 -----	15.6	22.1	21.2	19.0	12.7
Oct. 15 -----	9.2	10.0	9.9	9.8	6.4
53-H, furrowed: 3/					
Midway between furrows:					
May 4 -----	13.2	18.6	17.7	14.2	10.4
Oct. 16 -----	7.7	9.6	9.5	9.3	5.9
3 feet uphill from furrows:					
May 4 -----	18.2	20.8	20.5	19.6	12.9
Oct. 16 -----	8.1	9.0	9.2	10.3	6.0
In furrows:					
May 4 -----	23.9	22.4	21.9	20.9	14.6
Oct. 16 -----	9.2	10.9	11.5	12.7	7.2
3 feet downhill from furrows:					
May 4 -----	16.9	22.9	21.0	20.7	13.3
Oct. 16 -----	10.4	10.4	10.6	12.1	7.1
54-H, unfurrowed: 2/					
May 4 -----	14.0	14.1	10.0	13.5	8.4
Oct. 19 -----	8.0	9.4	9.3	10.4	6.1
55-H, furrowed: 3/					
Midway between furrows:					
May 6 -----	21.6	21.1	18.3	17.3	12.8
Oct. 25 -----	8.1	8.0	8.0	11.1	5.8
3 feet uphill from furrows:					
May 6 -----	22.1	22.8	21.6	22.1	14.5
Oct. 25 -----	8.3	7.5	8.8	10.5	5.7
In furrows:					
May 6 -----	24.5	21.9	22.9	22.4	15.0
Oct. 25 -----	7.9	7.7	9.2	10.2	6.7
3 feet downhill from furrows:					
May 6 -----	20.4	22.2	23.3	20.0	14.0
Oct. 25 -----	7.8	7.0	7.9	8.9	5.2

Table 17.--Soil-moisture content, in percent of dry weight, at designated depths in pasture plots 51-H to 58-H for 1943--Continued.

Plot and date	Soil-moisture content at depth of —				
	0-1 foot	1-2 feet	2-3 feet	3-4 feet	0-4 feet
	Percent	Percent	Percent	Percent	Inches
56-H, unfurrowed: 2/					
May 6 -----	19.3	21.0	17.5	14.5	11.8
Oct. 25 -----	10.3	8.7	8.3	10.2	6.1
57-H, unfurrowed: 2/					
May 10 -----	17.1	20.7	20.0	17.9	12.4
Oct. 26 -----	9.8	9.3	9.0	10.3	6.3
58-H, furrowed: 3/					
Midway between furrows:					
May 10 -----	15.4	13.3	11.8	12.1	8.6
Oct. 26 -----	6.8	7.1	7.0	8.1	4.7
3 feet uphill from furrows:					
May 10 -----	19.1	22.0	13.8	17.7	12.6
Oct. 26 -----	9.2	8.6	7.7	9.0	5.6
In furrows:					
May 10 -----	21.6	20.8	19.5	19.6	13.3
Oct. 26 -----	12.3	11.8	10.0	9.9	7.2
3 feet downhill from furrows:					
May 10 -----	16.4	21.5	19.1	17.5	12.2
Oct. 26 -----	8.7	7.5	8.0	8.4	5.0

- 1/ Expressed in total inches of water contained in the profile from soil surface to 4-foot depth.
- 2/ 3 points, 1 each at upper, center, and lower end of unfurrowed plot were sampled in duplicate and data averaged for each depth interval.
- 3/ 3 furrows, 1 each at upper, center, and lower end of furrowed plot were sampled in duplicate and the data at the 3 furrows averaged for each depth interval.

Table 18.—Soil-moisture content, in percent of dry weight, at designated depths at sampling stations 1 and 2 for 1945—Continued.

Station and date		Soil-moisture content at depth of --										$\frac{1}{2}$		$\frac{2}{3}$	
		0-1/2 foot	1/2-1 foot	1-2 foot	2-3 foot	3-4 foot	4-5 foot	5-6 foot	0-3 feet	Inches	0-6 feet	Inches			
Station No. 24/		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent						
May	5	34.2	28.3	24.5	22.9	---	---	---	---	12.8	---	---	---		
	23	36.6	29.7	27.7	25.2	24.9	23.9	20.6	20.6	14.1	---	---	25.4		
June	8	34.8	29.2	26.7	23.9	---	---	---	---	13.5	---	---	---		
	20	34.1	29.9	27.5	25.1	24.0	23.5	22.9	22.9	13.9	---	---	25.3		
July	5	14.9	20.6	22.6	22.6	---	---	---	---	10.3	---	---	---		
	20	28.5	25.6	22.9	20.3	20.6	19.9	19.6	19.6	21.5	---	---	21.3		
Aug.	6	16.4	17.6	21.0	20.9	---	---	---	---	9.6	---	---	---		
	21	10.5	12.7	17.7	19.8	20.6	20.4	20.7	20.7	8.0	---	---	18.1		
Sept.	5	8.2	11.9	15.5	16.5	---	---	---	---	7.2	---	---	---		
	20	8.8	11.0	13.0	16.1	19.2	20.0	20.7	20.7	6.4	---	---	16.2		
Oct.	5	27.5	22.6	15.1	15.8	---	---	---	---	9.1	---	---	---		
	22	20.1	19.9	12.2	13.7	16.7	18.7	18.8	18.8	7.5	---	---	16.4		
Nov.	6	22.9	21.8	14.4	14.9	---	---	---	---	8.4	---	---	---		
	20	19.0	20.3	14.7	13.9	18.6	20.1	20.4	20.4	7.9	---	---	17.6		
Dec.	5	26.7	22.4	14.0	15.2	---	---	---	---	8.8	---	---	---		
	20	24.0	19.9	14.9	15.2	18.4	19.9	20.4	20.4	8.5	---	---	18.1		

- 1/ Expressed in total inches of water contained in the profile from soil surface to 3-foot depth.
- 2/ Expressed in total inches of water contained in the profile from soil surface to 6-foot depth.
- 3/ 5 points 100 feet apart on a slope of a cultivated field sampled in duplicate and data averaged.
- 4/ 5 points 100 feet apart on a slope of a meadow sampled in duplicate and data averaged.

A substantial amount of the detailed data on soil moisture is available at the Hydrologic Data Laboratory. The data consist essentially of information comparable in detail to that given in tables 16, 17, and 18 mentioned above.

Moisture Tension Data ^{1/}

As part of their effort to determine the influence of soils upon the hydrologic performance of agricultural watersheds, the USDA Hydrograph Laboratory of the Agricultural Research Service sampled the soils of many of the experimental watersheds to determine moisture retention and conductivity characteristics.

The sampling was done in the years of 1964 and 1965. Pits were dug in the form of a "T" oriented to permit sunlight on the exposed-soil profile. The top of the T was about 8 feet long, 5 feet deep, and 2 feet wide, but the leg of the T was dug as a sloping ramp for easy access.

The local SCS soil scientist described the profile in accordance with the Soil Survey Manual ^{2/} and its 1962 supplement and marked each horizon for sampling. Two bags of loose material were obtained from each exposed horizon. Ten soil fragments, roughly cylindrical and 3 by 5 inches or smaller, were removed from each horizon in cohesive soils, such as those at Hastings. Great care was taken to avoid fracture or compaction.

Soil fragments were dipped in a solution of resin dissolved in methyl ethyl ketone as described by Brasher and others ^{3/}, bagged in plastic, and placed in 1-quart ice cream cartons for shipment. All samples were either wrapped or bagged tightly for shipment to laboratories for testing.

^{1/} Information in this section is extracted from Moisture-Tension Data for Selected Soils on Experimental Watersheds, by H. N. Holtan, C. B. England, G. P. Lawless, and G. A. Schumaker; Agric. Research Service ARS 41-444, October 1968.

^{2/} Soil Conservation Service. Soil Survey Manual. U.S. Dept. Agr. Handb. 18, 503 pp. 1951 (and 1962 supplement).

^{3/} Brasher, B. R. et al. Use of Saran Resin to Coat Natural Soil Clods for Bulk Density and Water-Retention Measurements. Soil Sci. 101:108, 1966.

Moisture retention determinations were made by the Agronomy Department of the University of Georgia. Desorption data were obtained with the techniques for pressure plate and membrane apparatus described by Richards and others^{4/}. Moisture retentions were determined in equilibrium at five pressures: 0.1, 0.3, and 0.6 bar, with a ceramic plate, and 3.0 and 15 bars, with a membrane.

Bulk densities were determined by liquid displacement techniques^{5/} at 0.3 bar tension moisture and again after oven drying, using a saran-coated, fist-sized fragment for the moisture condition pertaining at the time of sampling in the field.

Saturated vertical hydraulic conductivities were determined in the USDA Hydrograph Laboratory at Beltsville, Maryland, on two fist-sized fragments. Soil fragments were trimmed to roughly cylindrical shape, and a 1-inch slice was mounted with a watertight mastic in a 1-inch ring of 3-inch diameter. Mounted slices were subjected in duplicate to a constant head of water after overnight saturation, to determine the hydraulic conductivity for each soil horizon sampled.

Tables 19 through 32 present the information for each of the Hastings soils that were sampled. Profile descriptions are given on the "a" page of the tables; physical data are given on the "b" pages of the tables.

The soils listed at the top of the pages were named in accordance with the soil survey of 1963.

^{4/} Richards, L. A. et al. Saline and Alkali Soils. U.S. Dept. Agr. Handb. 60, 160 pp. 1954.

^{5/} Johnston, J. R. An Accurate Method for Determining Volume of Soil Clods. Soil Sci. 59:499-452. 1945.

The identification after the soil name is coded as follows, using the first table of the series as an example:

44	Location (all ARS watershed locations have been assigned location numbers)
01	Soil
P	Land use in which: P = long term pasture C = long term cultivation
a and b	Pit, a is for the first pit, b for the second.

The moisture is given for five tensions in each horizon as:

- (1) first and third lines in percent dry weight
- (2) second line in percent volume.

The bulk density (BD) in grams per cubic centimeter, is given for each horizon as:

- (1) first line as obtained at the 0.3 bar retention
- (2) second line as obtained after oven drying the sample.

The total porosity (TP) is given in percent volume computed by assuming specific gravities equal to 2.65 for all soils in both moist and oven dry conditions.

The saturated conductivity (K) is given in inches per hour for each duplicate slice of soil fragment obtained.

The rock percent is percent of weight of particles larger than 2.0 mm, as determined by dry sieving after crushing with a rubber pestle.

Table 19a.—Moisture tension data, Coly silt loam
(44,01,P,a and b)

Location: Webster Co.; 0.25 mi. S and 0.13 mi. W of NE cor. of Sec. 31, T4N R9W.
Vegetation and land use: Native grasses
Topography: 17 percent upland slope
Drainage: Excessive surface
Parent Material: Peorian loess
Described and sampled by: H. E. Paden and G. A. Schumaker

Horizon	Description
<u>Pit a</u>	
A1	0 to 5 inches. Dark grayish brown (10YR 4/2, moist) heavy silt loam; weak, fine and medium granular structure; slightly hard, very friable; noncalcareous; abrupt smooth boundary.
AC	5 to 11 inches. Brown (10YR 5/3, moist) silt loam; weak, fine and medium prismatic structure breaking to weak, medium granular structure; slightly hard, very friable; calcareous, violent effervescence; clear smooth boundary.
Clca	11 to 29 inches. Dark yellowish brown (10YR 4/4, moist) silt loam; massive (structureless); slightly hard, very friable; many medium to fine distinct pale brown (10YR 6/3, moist) mottles; calcareous, violent effervescence; calcium carbonate is soft to slightly hard segregations or concretions; some cleavage planes are coated with calcium carbonate; clear smooth boundary.
C2	29 to 38 inches. Light olive brown (2.5Y 5/4, moist) silt loam; massive (structureless); slightly hard, very friable; calcareous, violent effervescence; many medium and fine distinct light yellowish brown (10YR 6/3, moist) mottles; calcium carbonate is mostly soft to slightly hard concretions.
Note: Many worm casts 0 to 11 inches.	
<u>Pit b</u>	
A1	0 to 6 inches. Very dark grayish brown (10YR 3/2, moist) silt loam; weak, fine granular structure; slightly hard, very friable; calcareous, violent effervescence; many worm casts; clear smooth boundary.
Ac	6 to 11 inches. Dark grayish brown (2.5Y 4/2, moist) silt loam; weak medium prismatic structure breaking to weak, fine granular structure; slightly hard, very friable; calcareous, violent effervescence; many worm casts; calcium carbonate is soft to slightly hard oval concretions, some cleavage planes are coated with calcium carbonate; clear smooth boundary.
Cca	11 to 25 inches. Light olive brown (2.5Y 5/3, moist) silt loam; massive (structureless); slightly hard, very friable; many fine and medium distinct yellowish brown (10YR 5/6, moist) mottles; calcareous, violent effervescence; calcium carbonate is concretions which are soft to slightly hard, some cleavage planes are calcium carbonate coated.

Table 19b.—Moisture tension data, Coly silt loam (44,01,P, a and b)

WEIGHT PERCENT AND VOLUME PERCENT OF WATER RETAINED											
IDENTIFICATION				T E N S I O N S (BARS)							
44	1	1	1	.1	.3	.6	3.	15.	BD G/CC	TP PCT	K IN/HR
DEPTH:				1							
0-				35.23	29.18	28.45	21.34	16.32	1.38	47.92	.81
				48.61	40.26	39.26	29.44	22.52	1.66	37.36	.18
FRAGMENT				27.97	SIEVED			13.34	ROCK	PERCENT	
5				1							
				34.05	29.99	27.96	22.93	16.12	1.39	47.55	.16
				47.32	41.68	38.86	31.87	22.40	1.54	41.89	.42
FRAGMENT				29.13	SIEVED			15.33	ROCK	PERCENT	2.45
11				1							
				36.90	31.08	27.64	23.15	15.38	1.36	48.68	.24
				50.18	42.26	37.59	31.48	20.91	1.51	43.02	.36
FRAGMENT				29.18	SIEVED			16.02	ROCK	PERCENT	14.90

IDENTIFICATION				T E N S I O N S (BARS)							
44	1	1	2	.1	.3	.6	3.	15.	BD G/CC	TP PCT	K IN/HR
DEPTH									1		
0				31.73	28.04	23.12	19.56	13.73	1.38	47.92	.04
				43.78	38.69	31.90	26.99	18.94	1.60	39.62	.09
FRAGMENT				26.87			SIEVED	13.45	ROCK	PERCENT	2.31
6				31.44	26.76	24.12	19.40	13.87	1.36	48.68	.64
				42.75	36.39	32.80	26.38	18.86	1.50	43.40	.47
FRAGMENT				25.29			SIEVED	13.02	ROCK	PERCENT	1.16
11				39.23	32.07	28.29	21.91	13.50	1.31	50.57	.46
				51.39	42.01	37.05	28.70	17.68	1.42	46.42	.69
FRAGMENT				31.19			SIEVED	13.09	ROCK	PERCENT	2.13

1=FIST
2=CORE
3=LOOSE

Table 20a.—Moisture tension data, Coly silt loam, severely eroded (44,01,C,a and b)

Location: Webster Co.; Pit a 0.27 mi. N and 75' E of SW cor. Sec. 5, T3N R9W; Pit b 0.28 mi. N and 15' E of SW cor. Sec. 5, T3N R9W.

Vegetation and land use: Cultivated, alfalfa

Topography: 12 percent upland slope

Drainage: Excessive surface

Parent Material: Peorian loess

Described and sampled by: H. E. Paden and G. A. Schumaker

Horizon	Description
<u>Pit a</u>	
Ap	0 to 5 inches. Grayish brown (2.5Y 5/2, dry) silt loam, very dark grayish brown (2.5Y 3/2) when moist; weak, very fine platy structure breaking to weak, very fine crumb structure; slightly hard, very friable; noncalcareous; abrupt smooth boundary.
Cca	5 to 36 inches. Light brownish gray (2.5Y 6/2, dry) silt loam, light olive brown (2.5Y 5/4) when moist; massive (structureless); slightly hard, very friable; calcareous, violent effervescence.
	<u>Note:</u> Reddish yellow (7.5YR 5/6, moist) mottlings in several places 5-10mm across extend from the surface vertically to 22 in. Cleavage planes of the Cca horizon are coated with calcium carbonate. Many soft to slightly hard lime concretions mostly oval but some pipe-like in the Cca horizon.
<u>Pit b</u>	
Ap	0 to 6 inches. Light brownish gray (2.5Y 6/2, dry) heavy silt loam, dark grayish brown (2.5Y 4/2) when moist; weak, very fine platy structure breaking to weak, very fine crumb structure; slightly hard, very friable; calcareous; abrupt smooth boundary.
Cca	6 to 36 inches. Light gray (2.5Y 7/2, dry) silt loam, light olive brown (2.5Y 5/3) when moist; massive (structureless); slightly hard, very friable; calcareous, violent effervescence.
	<u>Note:</u> Common, medium, prominent reddish brown (5YR 4/4, moist) mottlings in the Cca horizon. Calcium carbonate is oval or pipe-like and is soft to slightly hard. Some of the cleavage planes are coated with calcium carbonate.

Table 20b.—Moisture tension data, Coly silt loam, severely eroded
(44,01,C,a and b)

WEIGHT PERCENT AND VOLUME PERCENT OF WATER RETAINED									
IDENTIFICATION		T E N S I O N S (BARS)					BD	TP	K
44	1 2 1	.1	.3	.6	3.	15.	G/CC	PCT	IN/HR
DEPTH		1							
0		34.39	29.41	25.47	21.69	15.53	1.44	45.66	.33
		49.52	42.35	36.67	31.23	22.36	1.65	37.74	.39
	FRAGMENT	27.44			SIEVED	14.94	ROCK PERCENT	2.34	
5		1							
		39.73	32.98	27.45	18.74	14.23	1.31	50.57	.43
		52.04	43.20	35.95	24.54	18.64	1.39	47.55	.65
	FRAGMENT	31.45			SIEVED	14.45	ROCK PERCENT	.14	

WEIGHT PERCENT AND VOLUME PERCENT OF WATER RETAINED									
IDENTIFICATION		T E N S I O N S (BARS)					BD	TP	K
44	1 2 2	.1	.3	.6	3.	15.	G/CC	PCT	IN/HR
DEPTH		1							
0		35.65	29.23	26.57	20.60	16.36	1.45	45.28	.40
		51.69	42.38	38.52	29.87	23.72	1.60	39.62	.19
	FRAGMENT	28.90			SIEVED	16.25	ROCK PERCENT	14.82	
6		1							
		38.47	30.62	27.52	17.68	13.33	1.38	47.92	.30
		53.08	42.25	37.97	24.39	18.39	1.48	44.15	.22
	FRAGMENT	29.28			SIEVED	13.13	ROCK PERCENT	1.21	

1=FIST
2=CORE
3=LOOSE

Table 21a.—Moisture tension data, Hastings silt loam (44,05,P,a)

Location: Webster Co.; 0.15 mi. W and 180' S of NE cor. of NE $\frac{1}{4}$ Sec. 1, T3N R10W.

Vegetation and land use: Native grasses

Topography: Nearly level

Drainage: Moderately well drained

Parent Material: Peorian loess

Described and sampled by: R. H. Jordan, J. V. Drew, G. A. Schumaker

Horizon	Description
A11	0 to 5 inches. Dark gray (10YR 4/1, dry) silt loam, black (10YR 2/1) when moist; moderate, fine granular structure; soft, friable; noncalcareous; roots abundant; clear smooth boundary.
A12	5 to 10 inches. Dark grayish brown (10YR 4/2, dry) heavy silt loam, very dark grayish brown (10YR 2/2) when moist; moderate, fine to medium granular structure; soft, friable; noncalcareous; roots abundant, occasional pea-size nests of insect casts less than 1mm in diameter; clear smooth boundary.
B1	10 to 16 inches. Dark grayish brown (10YR 4/2, dry) light silty clay loam, very dark grayish brown (10YR 3/2) when moist; weak, fine subangular blocky structure breaking to moderate, medium granular structure; soft, friable; noncalcareous; roots plentiful; occasional pea-size nests of insect casts less than 1mm in diameter; clear smooth boundary.
B2t	16 to 23 inches. Brown (10YR 5/3, dry) heavy silty clay loam, dark brown (10YR 3/3) when moist; 40% of ped faces are coated with dark gray (10YR 4/1, dry) to very dark gray (10YR 3/1, moist) coatings; weak to moderate, medium prismatic structure breaking to moderate, medium and fine subangular blocky structure; hard, firm; noncalcareous; roots numerous; gradual smooth boundary.
B3	23 to 31 inches. Pale brown (10YR 6/3, dry) silty clay loam, grayish brown (10YR 5/2) when moist; 30% of ped surfaces with dark gray (10YR 4/1, dry) to very dark gray (10YR 3/1, moist) coatings; weak, coarse prismatic structure breaking to moderate, medium and fine angular blocky structure; hard, firm; noncalcareous; few roots; abrupt smooth boundary. Note: A highly mottled zone occurred at 29 to 31 inches; very pale brown (10YR 6/3, moist) with many medium to fine distinct mottles of brownish yellow (10YR 6/8, moist); noncalcareous.
C1ca	31 to 40 inches. Very pale brown (10YR 7/3, dry) silt loam; brown (10YR 5/3) when moist; common fine distinct mottles of brownish yellow (10YR 6/8, moist); very weak, coarse prismatic structure; slightly hard, friable; few roots; calcareous; violent effervescence, carbonates occurring as soft to slightly hard segregates or concretions; gradual smooth boundary.
C2ca	40 to 50 inches. Very pale brown (10YR 7/3, dry) silt loam, brown (10YR 6/3) when moist; common, fine distinct mottles of brownish yellow (10YR 6/8, moist); massive (structureless); soft, friable; calcareous, strong effervescence, carbonates occurring as soft segregates fewer than horizon above; gradual smooth boundary. Note: Occasional dark coatings within tubular pores in loess. These coatings resemble clay films. A pocket about 5" in diam. contained an abundance of these tubular pores.
C3	50 to 60 inches. Very pale brown (10YR 7/3, dry) silt loam, pale brown (10YR 6/3) when moist; few, fine distinct mottles brownish yellow (10YR 6/8, moist); massive (structureless); soft, friable; calcareous, slight effervescence, occasional fine soft carbonate segregations.

Table 21b.--Moisture tension data, Hastings silt loam (44,05,P,a)

WEIGHT PERCENT AND VOLUME PERCENT OF WATER RETAINED											
IDENTIFICATION				T E N S I O N S (BARS)					BD	TP	K
44	5	1	1	.1	.3	.6	3.	15.	G/CC	PCT	IN/HR
DEPTH											
0				39.45	31.73	27.09	23.21	14.29	1.31 ¹	50.57	.26
				51.67	41.56	35.48	30.40	18.71	1.42	46.42	.27
				FRAGMENT	31.17		SIEVED	12.07	ROCK PERCENT		
5				36.31	31.36	28.50	26.34	17.39	1.37 ¹	48.30	.48
				49.74	42.96	39.04	36.08	23.82	1.65	37.74	.56
				FRAGMENT	30.92		SIEVED	18.93	ROCK PERCENT	3.79	
10				39.47	34.92	32.04	29.59	22.88	1.33 ¹	49.81	.52
				52.49	46.44	42.61	39.35	30.43	1.68	36.60	.54
				FRAGMENT	33.80		SIEVED	19.15	ROCK PERCENT		
16				34.86	30.45	29.32	25.71	22.54	1.33 ¹	49.81	.01
				46.36	40.49	38.99	34.19	29.97	1.61	39.25	0
				FRAGMENT	30.85		SIEVED	18.66	ROCK PERCENT		
23				37.70	27.22	25.83	22.42	17.89	1.46 ¹	44.91	.02
				55.04	39.74	37.71	32.73	26.11	1.52	42.64	.07
				FRAGMENT	28.63		SIEVED	18.75	ROCK PERCENT	1.55	
31				38.28	27.97	24.13	19.83	15.71	1.27 ¹	52.08	.58
				48.61	35.52	30.64	25.18	19.95	1.44	45.66	.62
				FRAGMENT	28.01		SIEVED	15.78	ROCK PERCENT	3.64	
40				36.27	28.43	22.88	17.94	13.33	1.34 ¹	49.43	.28
				48.60	38.09	30.65	24.03	17.86	1.43	46.04	.49
				FRAGMENT	27.41		SIEVED	14.05	ROCK PERCENT	6.42	

1=FIST
2=CORE
3=LOOSE

Table 22a.--Moisture tension data, Hastings silt loam (44,05,P,b)

Location: Webster Co.; .13 mi. W and 150' S of NE cor. Sec. 1, T3N R10W.
 Vegetation and land use: Native grasses
 Topography: Nearly level
 Drainage: Moderately well drained
 Parent Material: Peorian loess
 Described and sampled by: H. E. Paden and G. A. Schumaker

Horizon	Description
A11	0 to 5 inches. Dark gray (10YR 4/1, dry) silt loam, black (10YR 2/1) when moist; moderate, fine granular structure; soft, very friable; noncalcareous; clear smooth boundary.
A12	5 to 11 inches. Dark grayish brown (10YR 4/2, dry) silt loam, very dark grayish brown (10YR 2/2) when moist; moderate, fine and medium granular structure; slightly hard, very friable; noncalcareous; clear smooth boundary.
B1	11 to 17 inches. Dark grayish brown (10YR 4/2, dry) light silty clay loam, very dark grayish brown (10YR 3/2) when moist; weak, fine subangular blocky structure breaking to moderate, medium granular structure; slightly hard, friable; noncalcareous; clear smooth boundary.
B2t	17 to 24 inches. Brown (10YR 5/3, dry) heavy silty clay loam, dark brown (10YR 3/3) when moist; 40% of cleavage planes have dark gray (10YR 4/1, dry) to very dark gray (10YR 3/1) when moist organic coatings; weak, moderate prismatic structure breaking to moderate, medium and fine subangular blocky structure; hard, firm; noncalcareous; gradual smooth boundary.
B3	24 to 26 inches. Pale brown (10YR 6/3, dry) silty clay loam, grayish brown (10YR 5/2) when moist; organic coatings on 30% of cleavage planes, dark gray (10YR 4/1, dry) to very dark gray (10YR 3/1, moist); weak, coarse prismatic structure breaking to moderate, medium and fine angular blocky structure; hard, firm; noncalcareous.

Table 22b.--Moisture tension data, Hastings silt loam (44,05,P,b)

WEIGHT PERCENT AND VOLUME PERCENT OF WATER RETAINED										
IDENTIFICATION			T E N S I O N S (BARS)					BD	TP	K
44	5	1 2	.1	.3	.6	3.	15.	G/CC	PCT	IN/HR
DEPTH										
0			37.07	30.76	26.66	22.52	15.05	1.19	55.09	.52
			44.11	36.60	31.72	26.79	17.90	1.33	49.81	1.18
			FRAGMENT	30.23	SIEVED 13.17ROCK PERCENT					
5			32.58	28.82	27.16	24.16	19.07	1.23	53.58	.65
			40.07	35.44	33.40	29.71	23.45	1.39	47.55	.73
			FRAGMENT	28.13	SIEVED 15.47ROCK PERCENT					
11			33.33	30.71	27.38	26.02	22.11	1.35	49.06	.15
			44.98	41.45	36.96	35.12	29.84	1.69	36.23	.25
			FRAGMENT	29.42	SIEVED 20.02ROCK PERCENT					
17			36.52	29.10	28.03	26.77	22.71	1.30	50.94	0
			47.47	37.83	36.43	34.80	29.52	1.57	40.75	
			FRAGMENT	30.08	SIEVED 19.95ROCK PERCENT					

1=FIST

2=CORE

3=LOOSE

Table 23a.—Moisture tension data, Hastings silt loam (44,05,C,a)

Location: Webster Co.; 0.15 mi. W and 235' N of SE cor. of Sec. 36, T4N R10W.
 Vegetation and land use: Cultivated (alfalfa)
 Topography: 2 percent upland slope
 Drainage: Moderately well drained
 Parent Material: Peorian loess
 Described and sampled by: H. E. Paden and G. A. Schumaker

Horizon	Description
Ap	0 to 5 inches. Dark grayish brown (10YR 4/2, dry) silt loam, very dark brown (10YR 2/2) when moist; weak, very fine platy structure breaking to weak, very fine crumb structure; slightly hard, very friable; noncalcareous; abrupt wavy boundary.
B1	5 to 11 inches. Grayish brown (10YR 5/2, dry) coarse silty clay loam, very dark grayish brown (10YR 3/2) when moist; moderate, very fine sub-angular blocky structure; slightly hard, very friable; noncalcareous; clear smooth boundary.
B2t	11 to 21 inches. Brown (10YR 5/3, dry) fine silty clay loam, dark brown (10YR 3/3) when moist; weak to moderate, medium prismatic structure breaking to moderate, fine and medium angular blocky structure; hard, firm; noncalcareous; clear smooth boundary.
B3	21 to 28 inches. Pale brown (10YR 6/3, dry) silty clay loam, brown (10YR 4/3) when moist; moderate, medium prismatic structure breaking to moderate, medium angular blocky structure; hard, firm; noncalcareous; gradual smooth boundary.
C1	28 to 36 inches. Light yellowish brown (2.5Y 6/3, dry) silt loam, olive brown (2.5Y 4/3) when moist; moderate, coarse prismatic structure; slightly hard, very friable; noncalcareous; common, fine distinct strong brown (7.5YR 5/8, moist) mottlings; abrupt wavy boundary.
C2ca	36 to 60 inches. Light yellowish brown (2.5Y 6/3, dry) silt loam, olive brown (2.5Y 4/3) when moist; massive (structureless); slightly hard, very friable; calcareous, violent effervescence; calcium carbonate as concretions 2-5mm in diameter; matrix is not calcareous; common, medium distinct strong brown mottlings.

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Table 24a.—Moisture tension data, Hastings silty clay loam, eroded
(44,05,C,b)

Location: Webster Co.; 0.1 mi. W and 200' N of SE cor. Sec. 36, T4N R10W.

Vegetation and land use: Cultivated (Milo stubble)

Topography: 2 percent upland slope

Drainage: Moderately well drained

Parent Material: Peorian loess

Described and sampled by: H. E. Paden and G. A. Schumaker

Horizon	Description
Ap	0 to 5 inches. Dark brown (10YR 3/3, moist) silty clay loam; moderate, medium subangular blocky structure breaking to moderate very fine crumb structure; hard, friable; noncalcareous; abrupt wavy boundary.
B2t	5 to 11 inches. Dark brown (10YR 3/3, moist) silty clay; moderate, fine and medium angular blocky structure breaking to moderate very fine angular blocky structure; very hard, firm; noncalcareous; clear smooth boundary.
B3	11 to 17 inches. Brown (10YR 4/3, moist) silty clay loam; moderate, medium prismatic structure breaking to moderate, medium angular blocky structure; hard, friable; noncalcareous; abrupt wavy boundary.
Cca	17 to 48 inches. Olive brown (2.5Y 4/4, moist) silt loam; massive (structureless); slightly hard, very friable; calcareous; calcium carbonate concretions 2-5mm in diameter.

Note: Cleavage planes in the B2t and B3 horizons are coated with dark organic stainings. Reddish iron mottlings are common, medium and prominent in the Cca horizon. A few soft iron segregations or concretions in the Cca horizon.

Table 24b.—Moisture tension data, Hastings silty clay loam, eroded
(44,05,C,b)

WEIGHT PERCENT AND VOLUME PERCENT OF WATER RETAINED										
IDENTIFICATION		T E N S I O N S (BARS)					BD	TP	K	
44	5 2 2	.1	.3	.6	3.	15.	G/CC	PCT	IN/HR	
DEPTH 0		45.45	29.75	27.19	23.66	16.67	1.27	52.08	.32	
		57.72	37.78	34.53	30.04	21.17	1.34	49.43	1.47	
	FRAGMENT	27.55								
					SIEVED	14.35	ROCK PERCENT			
5		55.83	31.68	29.80	27.67	23.28	1.28	51.70	.17	
		71.46	40.55	38.14	35.41	29.79	1.50	43.40	.27	
	FRAGMENT	29.23								
					SIEVED	19.68	ROCK PERCENT			
11		51.56	31.08	27.99	25.11	21.05	1.44	45.66	.05	
		74.24	44.75	40.30	36.15	30.31	1.56	41.13	.06	
	FRAGMENT	29.10								
					SIEVED	18.02	ROCK PERCENT	2.40		
17		43.11	27.15	22.39	17.33	14.77	1.31	50.57	.34	
		56.47	35.56	29.33	22.70	19.34	1.42	46.42	.68	
	FRAGMENT	25.81								
					SIEVED	14.21	ROCK PERCENT	4.40		

1=FIST
2=CORE
3=LOOSE

Table 25a.—Moisture tension data, Holdrege silt loam (44,06,P,a)

Location: Webster Co.; 0.27 mi. N and 190' W of SE cor. Sec. 31, T4N R9W.
 Vegetation and land use: Native grasses
 Topography: 4 percent upland slope
 Drainage: Well drained
 Parent Material: Peorian loess
 Described and sampled by: H. E. Paden and G. A. Schumaker

Horizon	Description
A11	0 to 6 inches. Gray (10YR 5/1, dry) silt loam, very dark gray (10YR 3/1) when moist; weak, fine and medium, granular structure; soft, very friable; noncalcareous; clear smooth boundary.
A12	6 to 12 inches. Gray (10YR 5/1, dry) silt loam, very dark gray (10YR 3/1) when moist; moderate, medium granular structure; soft, very friable; noncalcareous; clear, smooth boundary.
B2t	12 to 20 inches. Brown (10YR 5/3, dry) silty clay loam, dark brown (10YR 3/3) when moist; moderate fine subangular blocky structure; hard, firm; noncalcareous; clear smooth boundary. Note: Few, fine distinct reddish yellow (7.5YR 6/8, moist) mottles.
B3	20 to 30 inches. Light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) when moist; weak, coarse prismatic structure breaking to moderate medium subangular blocky structure; hard, firm; noncalcareous; few, medium, prominent iron stains; gradual smooth boundary.
C1	30 to 39 inches. Light gray (5Y 7/2, dry) silt loam, olive gray (5Y 5/2) when moist; massive (structureless); soft, very friable; noncalcareous; common medium and coarse iron stains; gradual wavy boundary.
C2ca	39 to 60 inches. Light gray (5Y 7/2, dry) silt loam, olive gray (5Y 5/2) when moist; massive (structureless); soft, very friable; calcareous; violent effervescence. Soft to slightly hard calcium carbonate concretions 2-5mm in diameter. Many, medium and coarse, prominent iron stains.

Table 25b.—Moisture tension data, Holdrege silt loam (44,06,P,a)

WEIGHT PERCENT AND VOLUME PERCENT OF WATER RETAINED										
IDENTIFICATION			T E N S I O N S (BARS)					BD	TP	K
44	6	1 1	.1	.3	.6	3.	15.	G/CC	PCT	IN/HR
DEPTH										
0			57.53	32.95	28.99	24.29	16.53	1.18 ¹	55.47	1.58
			67.88	38.88	34.20	28.66	19.50	1.33	49.81	1.36
			FRAGMENT	30.44		SIEVED	17.24	ROCK PERCENT	2.32	
6			60.34	30.76	27.66	25.80	20.39	1.18 ¹	55.47	.55
			71.20	36.29	32.63	30.44	24.06	1.31	50.57	.78
			FRAGMENT	29.85		SIEVED	21.11	ROCK PERCENT	4.89	
12			56.93	29.89	27.88	25.13	20.80	1.24 ¹	53.21	.32
			70.59	37.06	34.57	31.16	25.79	1.45	45.28	.12
			FRAGMENT	29.84		SIEVED	21.16	ROCK PERCENT	.38	
20			47.94	27.75	26.06	23.07	17.24	1.36 ¹	48.63	.10
			65.19	37.74	35.44	31.37	23.44	1.55	41.51	.21
			FRAGMENT	26.85		SIEVED	15.53	ROCK PERCENT		
30			35.23	30.76	25.54	18.94	13.92	1.37 ¹	48.30	.33
			48.26	42.14	34.98	25.94	19.07	1.50	43.40	.37
			FRAGMENT	29.28		SIEVED	13.20	ROCK PERCENT		
39			40.31	34.31	27.42	16.88	13.65	1.27 ¹	52.08	.84
			51.19	43.57	34.82	21.43	17.33	1.37	48.30	1.05
			FRAGMENT	33.04		SIEVED	13.33	ROCK PERCENT	1.15	

1=FIST
2=CORE
3=LOOSE

Table 26a.—Moisture tension data, Holdrege silty clay loam, severely eroded (44,06,C,a)

Location: Webster Co.; 118' W of pit 44,06,P,a in Sec. 31, T4N R9W.
 Vegetation and land use: Cultivated (wheat)
 Topography: 4 percent upland slope
 Drainage: Well drained
 Parent Material: Peorian loess
 Described and sampled by: H. E. Paden and G. A. Schumaker

Horizon	Description
Ap	0 to 7 inches. Grayish brown (10YR 5/2, dry) silty clay loam, very dark grayish brown (10YR 3/2) when moist; weak, very fine crumb structure; slightly hard, friable; noncalcareous; abrupt smooth boundary.
B2t	7 to 13 inches. Light brownish gray (2.5Y 6/2, dry) silty clay loam, dark grayish brown (2.5Y 4/2) when moist; moderate, medium prismatic structure breaking to moderate, fine subangular blocky structure; hard, firm; non-calcareous; few, fine, prominent, reddish iron mottlings; clear smooth boundary.
B3	13 to 19 inches. Light gray (2.5Y 7/2, dry) silt loam, grayish brown (2.5Y 5/2) when moist; weak, medium prismatic structure separating to weak, medium subangular blocky structure; slightly hard, friable; noncalcareous; few, soft iron concretions; common, coarse, prominent reddish iron mottlings; gradual wavy boundary.
C1	19 to 30 inches. Pale yellow (5Y 7/3, dry) silt loam, olive (5Y 5/3) when moist; massive (structureless); slightly hard, very friable; noncalcareous; common medium, prominent iron mottlings; few iron concretions; abrupt wavy boundary.
C2ca	30 to 60 inches. Pale yellow (5Y 7/3, dry) silt loam, olive (5Y 5/3) when moist; massive (structureless); slightly hard, very friable; calcareous; violent effervescence; few pipe-like calcium carbonate concretions about 5mm in diameter; common, medium prominent reddish mottlings.

Table 26b.—Moisture tension data, Holdrege silty clay loam,
severely eroded (44,06,C,a)

WEIGHT PERCENT AND VOLUME PERCENT OF WATER RETAINED											
IDENTIFICATION				T E N S I O N S (BARS)					BD	TP	K
44	6	2	1	.1	.3	.6	3.	15.	G/CC	PCT	IN/HR
DEPTH											
0				33.51	30.84	29.36	22.28	18.18	1.41	46.79	.21
				47.24	43.48	41.39	31.41	25.63	1.58	40.38	.04
				FRAGMENT	29.20			SIEVED 16.66ROCK PERCENT		2.51	
1											
7				29.99	27.15	25.59	21.49	18.48	1.44	45.66	.35
				43.18	39.09	36.84	30.94	26.61	1.69	36.23	.50
				FRAGMENT	26.23			SIEVED 18.58ROCK PERCENT		.94	
1											
13				31.83	28.51	26.06	21.18	15.91	1.46	44.91	.32
				46.47	41.62	38.04	30.92	23.22	1.66	37.36	.24
				FRAGMENT	27.89			SIEVED 16.02ROCK PERCENT		16.51	
1											
19				34.89	31.30	25.84	19.18	14.16	1.30	50.94	.74
				45.35	40.69	33.59	24.93	18.40	1.43	46.04	.72
				FRAGMENT	32.98			SIEVED 17.51ROCK PERCENT		16.46	
1											
30				41.89	34.61	26.12	15.90	12.39	1.17	55.85	.50
				49.01	40.49	30.56	18.60	14.49	1.26	52.45	.46
				FRAGMENT	33.38			SIEVED 14.64ROCK PERCENT		3.25	

1=FIST
2=CORE
3=LOOSE

Table 27a.—Moisture tension data, Holdrege silty clay loam,
severely eroded (44,06,C,b)

Location: Webster Co.; 0.21 mi. S, 75' E of NW cor. Sec. 5, T3N R9W.
Vegetation and land use: Reseeded native grasses
Topography: 5 percent upland slope
Drainage: Well drained
Parent Material: Peorian loess
Described and sampled by: H. E. Paden and G. A. Schumaker

Horizon	Description
Ap	0 to 5 inches. Very dark grayish brown (10YR 3/2, moist) silty clay loam; moderate fine granular structure; slightly hard, friable; noncalcareous; abrupt smooth boundary.
B2t	5 to 14 inches. Dark grayish brown (10YR 4/2, moist) silty clay loam; moderate, medium prismatic structure breaking to moderate fine subangular blocky structure; hard, firm; noncalcareous; clear smooth boundary.
B3	14 to 21 inches. Dark grayish brown (10YR 4/2, moist) silty clay loam; moderate, medium prismatic structure separating to moderate, medium subangular blocky structure; hard, friable; noncalcareous; clear smooth boundary.
C1	21 to 26 inches. Pale brown (10YR 6/3, moist) silt loam; massive (structureless); slightly hard, very friable; noncalcareous; many, medium to fine prominent mottles of brownish yellow (10YR 6/8, moist).
C2ca	26 to 42 inches. Pale brown (10YR 6/3), moist) silt loam; massive (structureless); slightly hard, very friable; calcareous; violent effervescence, carbonates are segregates or concretions; common, fine distinct mottles brownish yellow (10YR 6/8, moist).

Table 27b.--Moisture tension data, Holdrege silty clay loam,
severely eroded (44,06,C,b)

WEIGHT PERCENT AND VOLUME PERCENT OF WATER RETAINED											
IDENTIFICATION				T E N S I O N S (BARS)					BD	TP	K
44	6	2	2	.1	.3	.6	3.	15.	G/CC	PCT	IN/HR
DEPTH											
0				35.29	32.09	29.35	23.55	16.92	1.41 ¹	46.79	.47
				49.75	45.24	41.38	33.20	23.85	1.58	40.38	.32
				FRAGMENT	32.97		SIEVED	15.89	ROCK PERCENT	.37	
5				38.94	33.97	31.99	26.45	21.18	1.35 ¹	49.06	.34
				52.56	45.85	43.18	35.70	28.59	1.74	34.34	.26
				FRAGMENT	31.93		SIEVED	22.22	ROCK PERCENT	.25	
14				35.57	32.19	30.04	25.00	20.95	1.32 ¹	50.19	.49
				46.95	42.49	39.65	33.00	27.65	1.65	37.74	1.14
				FRAGMENT	30.32		SIEVED	18.51	ROCK PERCENT		
21				37.27	30.22	25.00	18.93	15.04	1.28 ¹	51.70	.33
				47.70	38.68	32.00	24.23	19.25	1.41	46.79	.49
				FRAGMENT	29.89		SIEVED	14.28	ROCK PERCENT		

1=FIST
2=CORE
3=LOOSE

Table 28a.—Moisture tension data, Holdrege silt loam,
eroded (44,06,C,c)

Location: Webster Co.; 0.23 mi. S and 35' E of NW cor. Sec. 5, T3N R9W.
Vegetation and land use: Reseeded native grasses
Topography: 4 percent upland slope
Drainage: Well drained
Parent Material: Peorian loess
Described and sampled by: H. E. Paden and G. A. Schumaker

Horizon	Description
Ap	0 to 5 inches. Very dark brown (10YR 2/2, moist) silt loam; weak, fine granular structure; slightly hard, very friable; noncalcareous; abrupt smooth boundary.
B2t	5 to 17 inches. Very dark grayish brown (10YR 3/2, moist) silty clay loam; moderate, very fine subangular blocky structure; hard, firm; noncalcareous; clear smooth boundary.
B3	17 to 25 inches. Dark grayish brown (2.5Y 4/2, moist) silty clay loam; moderate, medium prismatic structure breaking to weak medium subangular blocky structure; slightly hard, friable; noncalcareous; clear smooth boundary.
C1	25 to 31 inches. Olive brown (2.5Y 4/3, moist) silt loam; massive (structureless); slightly hard, very friable; noncalcareous; many, medium prominent yellowish brown (10YR 5/8, moist) mottlings; clear smooth boundary.
C2ca	31 to 42 inches. Olive brown (2.5Y 4/3, moist) silt loam; massive (structureless); slightly hard, very friable; calcareous; few, fine distinct yellowish brown (10YR 5/8, moist) mottlings; calcium carbonate is slightly hard segregations or concretions.

Table 28b.—Moisture tension data, Holdrege silt loam,
eroded (44,06,C,c)

WEIGHT PERCENT AND VOLUME PERCENT OF WATER RETAINED										
IDENTIFICATION			T E N S I O N S (BARS)					BD	TP	K
44	6	2· 3	.1	.3	.6	3.	15.	G/CC	PCT	IN/HR
DEPTH										
0			30.03	27.09	25.00	20.48	12.84	1.47	44.53	.09
			44.14	39.82	36.75	30.10	18.87	1.57	40.75	.08
			FRAGMENT	26.51		SIEVED	10.72	ROCK PERCENT		
5			40.95	35.78	33.48	27.86	22.40	1.32	50.19	1.00
			54.05	47.22	44.19	36.77	29.56	1.74	34.34	.84
			FRAGMENT	33.87		SIEVED	22.99	ROCK PERCENT	.33	
17			33.33	30.35	28.57	24.34	21.58	1.44	45.66	.28
			47.99	43.70	41.14	35.04	31.07	1.62	38.87	.40
			FRAGMENT	29.37		SIEVED	21.42	ROCK PERCENT	.82	
25			37.76	31.55	26.49	18.60	13.00	1.33	49.81	.83
			50.22	41.96	35.23	24.73	17.29	1.46	44.91	.62
			FRAGMENT	30.03		SIEVED	15.21	ROCK PERCENT	2.44	

1=FIST
2=CORE
3=LOOSE

Table 29a.—Moisture tension data, Hobbs silt loam
(44,08,P,a and b)

Location: Webster Co.; Pit a 0.5 mi. W, 0.24 mi. S and 225' W of NE cor. Sec. 18, T3N R9W;
Pit b 0.5 mi. W, 0.24 mi. S and 175' W of NE cor. Sec. 18, T3N R9W.
 Vegetation and land use: Native grasses
 Topography: Nearly level
 Drainage: Occasionally flooded
 Parent Material: Alluvium
 Described and sampled by: H. E. Paden and G. A. Schumaker

Horizon	Description
<u>Pit a</u>	
A11	0 to 7 inches. Very dark grayish brown (10YR 3/2, moist) silt loam; weak, very fine granular structure; slightly hard, very friable; noncalcareous; clear smooth boundary.
A12	7 to 19 inches. Very dark brown (10YR 2/2, moist) silt loam; weak, fine granular structure; slightly hard, very friable; noncalcareous; abrupt smooth boundary.
A1b	19 to 36 inches. Black (10YR 2/1, moist) silt loam; moderate, fine and medium granular structure; slightly hard, very friable; noncalcareous.
<u>Pit b</u>	
A11	0 to 4 inches. Very dark grayish brown (10YR 3/2, moist) silt loam; weak, fine platy structure breaking to weak, very fine crumb structure; slightly hard, very friable; noncalcareous; clear smooth boundary.
A12	4 to 15 inches. Very dark brown (10YR 2/2, moist) silt loam; weak fine granular structure; slightly hard, very friable; noncalcareous; clear smooth boundary.
A1b	15 to 30 inches. Very dark brown (10YR 2/2, moist) silt loam; moderate fine granular structure; slightly hard, very friable; noncalcareous.

Table 29b.--Moisture tension data, Hobbs silt loam (44,08,P,a and b)

WEIGHT PERCENT AND VOLUME PERCENT OF WATER RETAINED											
IDENTIFICATION				T E N S I O N S (BARS)					BD	TP	K
44	8	1	1	.1	.3	.6	3.	15.	G/CC	PCT	IN/HR
DEPTH											
0				32.65	27.16	22.11	16.47	10.25	1.44 ¹	45.66	.72
				47.01	39.11	31.83	23.71	14.76	1.47	44.53	.40
				FRAGMENT	26.19		SIEVED	11.29ROCK	PERCENT	.64	
7				35.96	25.00	19.32	13.72	9.81	1.29 ¹	51.32	.63
				46.38	32.25	24.92	17.69	12.65	1.28	51.70	.91
				FRAGMENT	24.81		SIEVED	9.36ROCK	PERCENT		
19				33.61	23.31	19.55	14.63	11.15	1.28 ¹	51.70	1.00
				43.02	29.83	25.02	18.72	14.27	1.38	47.92	1.25
				FRAGMENT	23.34		SIEVED	10.42ROCK	PERCENT		

WEIGHT PERCENT AND VOLUME PERCENT OF WATER RETAINED											
IDENTIFICATION				T E N S I O N S (BARS)					BD	TP	K
44	8	1	2	.1	.3	.6	3.	15.	G/CC	PCT	IN/HR
DEPTH											
0				31.62	26.92	22.35	17.25	6.63	1.36 ¹	48.68	.11
				43.00	36.61	30.39	23.46	9.01	1.52	42.64	.64
				FRAGMENT	26.65		SIEVED	10.46ROCK	PERCENT		
4				33.33	22.64	17.73	13.06	8.55	1.35 ¹	49.06	.95
				44.99	30.56	23.93	17.63	11.54	1.43	46.04	1.13
				FRAGMENT	22.77		SIEVED	9.70ROCK	PERCENT		
15				33.33	24.38	16.49	14.28	11.53	1.27 ¹	52.08	1.40
				42.32	30.96	20.94	18.13	14.64	1.35	49.06	2.64
				FRAGMENT	24.63		SIEVED	9.70ROCK	PERCENT		

1=FIST
2=CORE
3=LOOSE

Table 30a.—Moisture tension data, Hobbs silt loam
(44,08, C,a and b)

Location: Webster Co.; Pit a 0.5 mi. W and 0.12 mi. S and 25' E of NE cor. Sec. 7, T3N R9W; Pit b 0.5 mi. W, 0.10 mi. S and 50' E of NE cor. Sec. 7, T3N R9W.
Vegetation and land use: Cultivated (milo stubble)
Topography: Nearly level
Drainage: Occasionally flooded
Parent Material: Alluvium
Described and sampled by: H. E. Paden and G. A. Schumaker

Horizon	Description
Pit <u>a</u>	
Ap	0 to 4 inches. Dark brown (10YR 3/3, moist) silt loam; weak, fine crumb structure; soft, very friable; noncalcareous; abrupt smooth boundary.
A11	4 to 25 inches. Very dark grayish brown (10YR 3/2, moist) silt loam; weak, very coarse granular structure; soft, very friable; noncalcareous; clear smooth boundary.
A12	25 to 50 inches. Very dark brown (10YR 2/2, moist) silt loam; weak fine granular structure; soft, very friable; noncalcareous; abrupt smooth boundary.
Alb	50 to 60 inches. Black (10YR 2/1, moist) silt loam; weak, very fine crumb structure; soft, very friable; noncalcareous.
Pit <u>b</u>	
Ap	0 to 5 inches. Light brownish gray (10YR 6/2, dry) silt loam, dark grayish brown (10YR 4/2) when moist; weak, very fine crumb structure; slightly hard, very friable; noncalcareous; abrupt smooth boundary.
A11	5 to 17 inches. Pale brown (10YR 6/3, dry) silt loam, brown (10YR 4/3) when moist; weak, very fine crumb structure; slightly hard, very friable; noncalcareous; gradual smooth boundary.
A12	17 to 29 inches. Grayish brown (10YR 5/2, dry) silt loam; very dark grayish brown (10YR 3/2) when moist; weak, fine granular structure; slightly hard, very friable; noncalcareous; abrupt wavy boundary.
Alb	29 to 46 inches. Dark gray (10YR 4/1, dry) silt loam, black (10YR 2/1) when moist; weak fine granular structure; slightly hard, very friable; noncalcareous.

Table 3Ob.---Moisture tension data, Hobbs silt loam (44,08,C,a and b)

WEIGHT PERCENT AND VOLUME PERCENT OF WATER RETAINED											
IDENTIFICATION				T E N S I O N S (BARS)					BD	TP	K
44	8	2	1	.1	.3	.6	3.	15.	G/CC	PCT	IN/HR
DEPTH											
0				32.79	27.24	24.04	19.55	10.68	1.37	48.30	.22
				44.92	37.31	32.93	26.78	14.63	1.48	44.15	.04
				FRAGMENT	27.32	SIEVED		10.44ROCK	PERCENT		
4				31.14	23.85	22.39	15.51	8.44	1.40	47.17	.55
				43.59	33.39	31.34	21.71	11.81	1.44	45.66	.47
				FRAGMENT	23.21	SIEVED		8.72ROCK	PERCENT		
25				35.67	28.39	26.76	16.36	10.81	1.25	52.83	.72
				44.58	35.48	33.45	20.45	13.51	1.30	50.94	2.34
				FRAGMENT	26.54	SIEVED		11.88ROCK	PERCENT	.21	
50				31.25	30.96	26.94	20.88	15.11	1.21	54.34	.66
				37.81	37.46	32.59	25.26	18.28	1.22	53.96	.66
				FRAGMENT	29.87	SIEVED		16.25ROCK	PERCENT	.22	

IDENTIFICATION				T E N S I O N S (BARS)					BD	TP	K
44	8	2	2	.1	.3	.6	3.	15.	G/CC	PCT	IN/HR
DEPTH									1		
0				33.96	27.52	22.56	17.17	11.43	1.37	48.30	.37
				46.52	37.70	30.90	23.52	15.65	1.47	44.53	.35
				FRAGMENT	26.59		SIEVED	10.91ROCK	PERCENT	.54	
5				32.24	25.59	23.38	17.16	11.00	1.40	47.17	.16
				45.13	35.82	32.73	24.02	15.40	1.47	44.53	.14
				FRAGMENT	25.64		SIEVED	12.55ROCK	PERCENT	.71	
17				30.69	25.52	22.78	20.29	10.52	1.41	46.79	.36
				43.27	35.98	32.11	28.60	14.83	1.58	40.38	.34
				FRAGMENT	25.39		SIEVED	10.08ROCK	PERCENT		
29				32.25	28.86	25.68	22.11	15.75	1.34	49.43	0
				43.21	38.67	34.41	29.62	21.10	1.50	43.40	.02
				FRAGMENT	27.99		SIEVED	16.13ROCK	PERCENT		

1=FIST
2=CORE
3=LOOSE

Table 31a.--Moisture tension data, Geary silt loam
(44,09,P,a and b)

Location: Webster Co.: Pit a 0.13 mi. N and 650' E of SE cor. of SW $\frac{1}{4}$ Sec. 31, T4N R9W;
Pit b 0.15 mi. N and 650' E of SE cor. of SW $\frac{1}{4}$ Sec. 31, T4N R9W.
 Vegetation and land use: Native grasses
 Topography: 4 percent upland slope
 Drainage: Well drained
 Parent Material: Loveland loess
 Described and sampled by: H. E. Paden and G. A. Schumaker

Horizon	Description
<u>Pit a</u>	
A1	0 to 8 inches. Very dark brown (10YR 2/2, moist) silt loam; moderate fine granular structure; slightly hard, very friable; noncalcareous; clear smooth boundary.
B1	8 to 12 inches. Dark brown (7.5YR 3/2, moist) silty clay loam; weak, very fine subangular blocky structure; hard, friable; noncalcareous; clear smooth boundary.
B2c	12 to 20 inches. Dark brown (7.5YR 4/3, moist) silty clay loam; strong, fine angular blocky structure; continuous clay films; hard, firm; noncalcareous; clear smooth boundary.
B3	20 to 26 inches. Dark brown (7.5YR 4/4, moist) silty clay loam; moderate, fine prismatic structure breaking to moderate fine subangular blocky structure; hard, friable; noncalcareous.
<u>Pit b</u>	
A1	0 to 10 inches. Very dark brown (10YR 2/2, moist) silt loam; moderate fine granular structure; slightly hard, very friable; noncalcareous; clear smooth boundary.
B1	10 to 14 inches. Very dark grayish brown (10YR 3/2, moist) silt loam; moderate, very fine subangular blocky structure; slightly hard, very friable; noncalcareous; clear smooth boundary.
B2c	14 to 21 inches. Dark brown (7.5YR 4/2, moist) silty clay loam; strong, fine, angular blocky structure; hard, friable; noncalcareous; clear smooth boundary.
B3	21 to 28 inches. Dark brown (7.5YR 4/3, moist) silty clay loam; moderate, medium prismatic structure breaking to moderate medium angular blocky structure; hard, friable; noncalcareous.

Table 31b.—Moisture tension data, Geary silt loam (44,09,P,a and b)

WEIGHT PERCENT AND VOLUME PERCENT OF WATER RETAINED									
IDENTIFICATION				T E N S I O N S (BARS)					
44	9	1	1	.1	.3	.6	3.	15.	BD G/CC
									TP PCT
									K IN/HR
DEPTH									
0				34.50	29.32	25.69	16.93	14.22	1
				46.23	39.28	34.42	22.68	19.05	1.34
				FRAGMENT	27.84		SIEVED	12.28ROCK	49.43
									.63
									.58
8				33.49	28.71	25.86	22.26	15.83	1
				44.20	37.89	34.13	29.38	20.89	1.32
				FRAGMENT	26.31		SIEVED	14.28ROCK	50.19
									.43
									.71
12				28.74	25.63	23.16	20.37	15.57	1
				42.53	37.93	34.27	30.14	23.04	1.48
				FRAGMENT	25.34		SIEVED	14.85ROCK	44.15
									.64
									.80
20				24.33	22.60	21.11	17.97	14.49	1
				37.95	35.25	32.93	28.03	22.60	1.56
				FRAGMENT	21.68		SIEVED	14.07ROCK	41.13
									.14
									.05

IDENTIFICATION				T E N S I O N S (BARS)					
44	9	1	2	.1	.3	.6	3.	15.	BD G/CC
									TP PCT
									K IN/HR
DEPTH									
0				35.93	27.35	23.48	18.83	14.15	1
				47.06	35.82	30.75	24.66	18.53	1.31
				FRAGMENT	25.56		SIEVED	11.78ROCK	50.57
									.92
									1.41
10				30.94	26.89	25.68	21.95	15.67	1
				40.22	34.95	33.38	28.53	20.37	1.30
				FRAGMENT	27.10		SIEVED	15.19ROCK	50.94
									.90
									1.01
14				30.25	26.12	24.37	22.10	16.79	1
				43.25	37.35	34.84	31.60	24.00	1.43
				FRAGMENT	24.32		SIEVED	15.51ROCK	46.04
									.32
									.72
21				23.85	20.87	19.92	18.75	14.55	1
				36.25	31.72	30.27	28.50	22.11	1.52
				FRAGMENT	20.28		SIEVED	13.97ROCK	42.64
									.27
									.06

1=FIST
2=CORE
3=LOOSE.

Table 32a.—Moisture tension data, Geary silty clay loam, eroded
(44,09,C,a and b)

Location: Webster Co.: Pit a 0.13 mi. N and 700' E of SW cor. SE $\frac{1}{4}$ Sec. 31, T4N R9W;
Pit b 0.12 mi. N and 700' E of SW cor. SE $\frac{1}{4}$ Sec. 31, T4N R9W.

Vegetation and land use: Cultivated (milo stubble)

Topography: 5 percent upland slope

Drainage: Well drained

Parent Material: Loveland loess

Described and sampled by: H. E. Paden and G. A. Schumaker

Horizon	Description
<u>Pit a</u>	
Ap	0 to 4 inches. Dark brown (7.5YR 4/2, dry) silty clay loam, dark brown (7.5YR 3/2) when moist; moderate, fine platy structure separating to weak, very fine crumb structure; slightly hard, friable; noncalcareous; abrupt smooth boundary.
B2t	4 to 10 inches. Brown (7.5YR 5/4, dry) silty clay loam, dark brown (7.5YR 4/4) when moist; moderate, fine angular blocky structure; hard, friable; noncalcareous; clay films are prominent; dark organic stainings on cleavage planes; clear smooth boundary.
B3	10 to 18 inches. Brown (7.5YR 5/4, dry) silty clay loam, dark brown (7.5YR 4/3) when moist; weak, medium, prismatic structure breaking to weak, medium subangular blocky structure; slightly hard, friable; noncalcareous; clear wavy boundary.
Cca	18 to 60 inches. Light brown (7.5YR 6/4, dry) silt loam, brown (7.5YR 4/4) when moist; massive (structureless); slightly hard, very friable; calcareous.
<u>Pit b</u>	
Ap	0 to 4 inches. Dark brown (7.5YR 3/2 moist) silty clay loam; weak, very fine granular structure; hard, firm; noncalcareous; abrupt smooth boundary.
B3	4 to 11 inches. Dark brown (7.5YR 4/4, moist) silty clay loam; moderate, medium subangular blocky structure; slightly hard, friable; clear smooth boundary.
C1	11 to 15 inches. Dark brown (7.5YR 4/4, moist) silty clay loam; massive (structureless); slightly hard, friable; noncalcareous; clear wavy boundary.
C2ca	15 to 48 inches. Dark brown (7.5YR 4/4, moist) silt loam; massive (structureless); slightly hard, very friable; calcareous; violent effervescence.
Note: Dark colored organic stainings are common on ped faces 0-11". Soft calcium carbonate and iron concretions in C2ca. Reddish brown iron mottlings in C2ca.	

Table 32b.---Moisture tension data, Geary silty clay loam, eroded
(44,09,C,a and b)

WEIGHT PERCENT AND VOLUME PERCENT OF WATER RETAINED											
IDENTIFICATION				T E N S I O N S (BARS)					BD	TP	K
44	9	2	1	.1	.3	.6	3.	15.	G/CC	PCT	IN/HR
DEPTH											
0				32.09	26.36	24.63	21.97	14.39	1.35 ¹	49.06	.91
				43.32	35.58	33.25	29.65	19.42	1.59	40.00	.86
FRAGMENT				24.58	SIEVED			13.74ROCK	PERCENT		
4				27.48	24.88	22.88	20.89	15.57	1.52 ¹	42.64	.09
				41.76	37.81	34.77	31.75	23.66	1.77 ¹	33.21	.04
FRAGMENT				23.53	SIEVED			15.40ROCK	PERCENT		
10				27.09	23.46	22.75	19.86	14.64	1.54 ¹	41.89	.08
				41.71	36.12	35.03	30.58	22.54	1.77 ¹	33.21	.02
FRAGMENT				23.29	SIEVED			14.84ROCK	PERCENT		
18				28.11	23.38	20.19	17.05	11.97	1.46 ¹	44.91	.08
				41.04	34.13	29.47	24.89	17.47	1.62	38.87	.23
FRAGMENT				21.66	SIEVED			13.62ROCK	PERCENT		
IDENTIFICATION				T E N S I O N S (BARS)					BD	TP	K
44	9	2	2	.1	.3	.6	3.	15.	G/CC	PCT	IN/HR
DEPTH											
0				28.34	24.60	23.04	19.44	14.90	1.39 ¹	47.55	.07
				39.39	34.19	32.02	27.02	20.71	1.62	38.67	.25
FRAGMENT				23.08	SIEVED			13.94ROCK	PERCENT		
4				27.70	24.13	22.80	18.87	14.78	1.54 ¹	41.89	.02
				42.65	37.16	35.11	29.05	22.76	1.76	33.58	.02
FRAGMENT				23.26	SIEVED			14.02ROCK	PERCENT		
11				27.86	23.07	22.17	18.51	14.23	1.54 ¹	41.89	0
				42.90	35.52	34.14	28.50	21.91	1.75	33.96	.02
FRAGMENT				23.33	SIEVED			17.61ROCK	PERCENT	18.80	
15				28.44	24.13	21.73	18.38	12.79	1.58 ¹	40.38	.02
				44.93	38.12	34.33	29.04	20.20	1.73	34.72	.17
FRAGMENT				24.46	SIEVED			14.08ROCK	PERCENT	23.29	
1=FIST											
2=CORE											
3=LOOSE											

Sediment

The collection of sediment records was initiated in 1957 at runoff stations W-3 and W-5.

Samples of suspended sediment were collected manually with an integrating sampler, the USDH-48, for three verticles in the stream cross sections. Each of the verticles represented approximately one-third of the flow passed by the gaging station. The sediment concentrations varied considerably with time and so the samples were taken at time intervals short enough to define a continuous graphical record of the suspended sediment concentration. The manual samples were related to the runoff record by marking the runoff chart at the time of sampling.

Laboratory analysis of the individual sample consisted of weighing the sample, allowing time for settling, decanting the clear water, drying, determining the dry weight of the sediment, and computing the "parts-per-million" by weight. The average of the three samples then represented the instantaneous concentration for a specific time and stage.

Instantaneous stream discharge and the sediment concentrations, determined as above, were used with the appropriate conversion factors to compute the sediment rates and total suspended sediment yield for storm events. Automatic single-stage sediment samplers, Model A-58, were used to supplement the manual sampling during the period of the hydrograph rise, as shown in figure 24.

The sampling with the hand sampler was done by the permanent personnel of the station and two local farmers who were given careful training. The quality of the records is considered to range from fair to good.

In 1963 a Coshocton Wheel sediment sampler was installed at the outlet of the flume of small watershed 4-H. The quality of the estimates derived from this sampler is considered to range from fair to good.

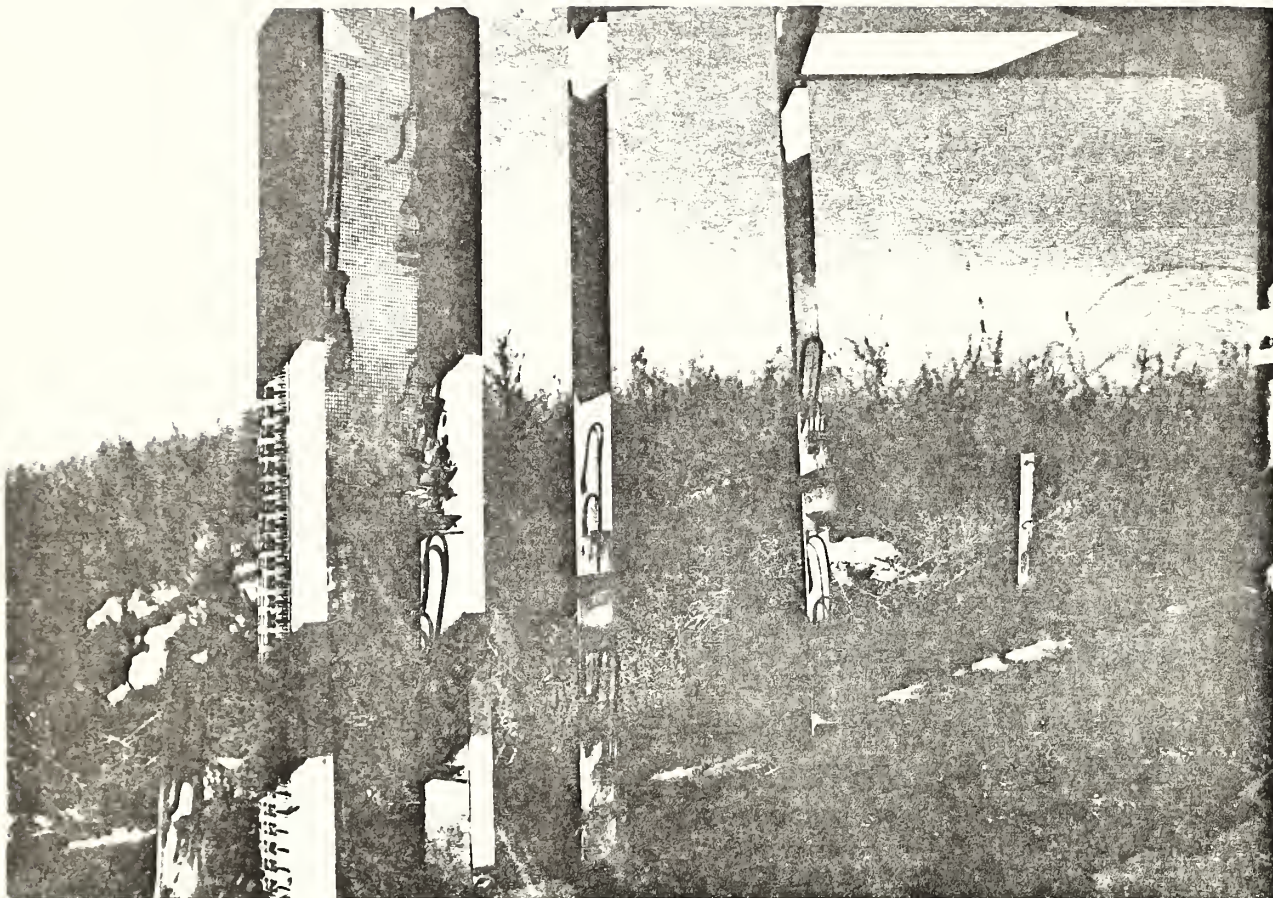


Figure 24.--Automatic single-stage sediment sampler installed at gaging station W-3.

Sediment Data

The sediment yields of watersheds W-3, W-5, and 4-H are summarized in table 33. The detailed breakpoint version of these sedimentation data are in the files of the Hydrologic Data Laboratory.

Limited data is available for the sedimentation studies of the Meents, Schumm and Lampman Ponds. The ponds were equipped with water stage recorders, and were surveyed for development of stage-capacity curves. The Meents Pond was equipped with a V-notch weir.

Reservoir sedimentation surveys were completed on the Meents Pond in 1963 and on the Schumm and Lampman Ponds in 1964. The survey of the Schumm Pond was able to identify the thickness of sediment laid down since construction. For the Lampman and Meents Ponds, the thickness of sedimentation since construction could not be determined and the 1964 surveys were therefore considered only to be the reference for future surveys.

The Schumm Pond was resurveyed in October 1966. Following is a summary of the sedimentation data for the pond:

	Year		
	1961	1964	1966
Remaining capacity, AF	6.64	4.34	1.77
Depth of soil lost from drainage area, inches	--	.23	.48
Volume weight, lbs/ft ³	--	87.1	87.1
Particle density, gm/cc	--	2.53	2.53

The grain size distribution of the sediment, in the USDA classification, was clay, 31%; silt, 64%; and sand, 3%.

Table 33.—Monthly and annual sediment yields in tons per acre for watersheds W-3, W-5, and 4-H for period of record

Year	Months												Total for year
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
Watershed W-3													
1957	O	O	T	.60	1.51	9.72	O	1.41	O	O	O	O	13.24
1958	O	.01	.03	.15	O	1.13	.80	.60	.02	O	O	O	2.74
1959	O	.05	.40	T	1.97	2.35	4.28	.28	.70	.07	O	O	10.10
1960	O	T	.49	.50	8.16	5.87	.08	T	.82	O	O	O	15.92
1961	O	O	.02	.03	1.47	1.71	.03	1.37	.12	O	O	O	4.75
1962	.02	T	.31	O	.02	1.32	1.92	1.37	.14	.21	O	O	5.31
1963	T	.03	.03	O	O	1.08	.05	T	5.71	.57	O	O	7.47
1964	O	O	O	O	O	3.91	1.35	1.91	.08	O	O	O	7.25
1965	O	.06	.18	.03	16.72	5.17	1.29	T	.16	O	O	O	23.61
1966	O	.10	O	O	O	.09	1.07	.01	O	O	O	O	1.27
1967	O	O	O	O	.01	.88	.07	O	.17	.07	O	O	1.20
Watershed W-5 ^{1/}													
1957	O	O	T	.07	1.46	10.67	O	1.34	O	O	O	O	13.54
1958	O	T	.10	.30	O	1.53	.40	.12	T	O	O	O	2.45
1959	O	T	.16	T	2.50	1.28	2.39	.84	.22	.04	O	O	7.43
1960	O	T	.33	.19	4.12	2.31	T	.01	.08	O	O	O	7.04
1961	O	O	T	O	.31	.72	.02	.14	.02	O	O	O	1.21
1962	.01	O	.02	O	.02	.04	.08	.18	.02	.04	O	O	.41
1963	T	T	T	O	O	T	T	T	.34	.02	O	O	.36
1964	O	O	O	O	O	.68	.14	.31	.05	O	O	O	1.18
1965	O	.76	.06	T	10.84	3.14	.66	T	.05	O	O	O	15.51
1966	O	.02	O	O	O	.13	.53	T	.01	O	O	O	.69
1967	O	O	O	O	.03	.34	.29	O	.05	T	O	O	.71
Watershed 4-H													
1963	O	O	.05	O	O	.10	O	O	.88	.04	O	O	1.07
1964	O	O	O	O	O	11.09	8.76	8.42	.80	O	O	O	29.07
1965	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1966	O	T	O	O	O	T	.04	O	O	O	O	O	.04
1967	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

^{1/} The sediment yield on W-5 is based on the area of 220 acres below two small reservoirs.

Central Meteorological Station

A central meteorological station (met station), where values for several of the standard climatic factors were recorded, was maintained throughout the period of record. Installation of the equipment, field observations, and data reduction was in accordance with the standards established by the Weather Bureau and as outlined in the "Field Manual for Research in Agricultural Hydrology", Agricultural Handbook No. 224.

For the first years of record the met station was at the location of rain gage B38R as shown in figure 1. It was moved to the new location as shown by the symbol MET on figure 1 on June 11, 1942. A view of the station is shown in figure 25.

Measurements of air temperature were made with maximum and minimum thermometers and a hygrothermograph. The instruments were housed in the shelter commonly used by the U.S. Weather Bureau. The recorder pen readings were checked with the maximum and minimum thermometer readings.

The hygrothermograph provided a continuous record of relative humidity. The instrument was adjusted as needed by reference to the more reliable readings from a sling psychrometer. Sling psychrometer readings were made daily at 8:00 a.m., with some exceptions. Average daily relative humidity values from the hygrothermograph chart were used with mean daily air temperatures (average of maximum and minimum) to compute daily dew point temperatures.

Measurement of daily pan evaporation was made by use of the standard U.S. Weather Bureau Class A pan during the ice free season of April 1 through October 31. The water was maintained at about two inches below the top rim of the pan and the top rim was about 15 inches above ground level. Readings were made at 8:00 a.m. each day.

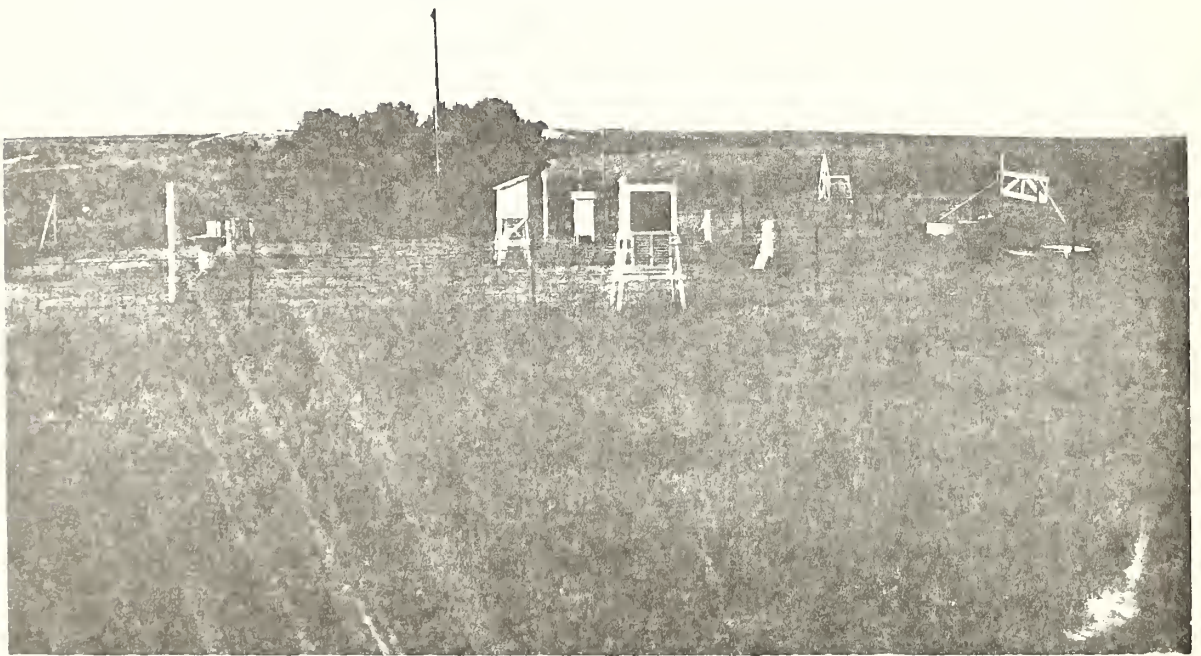


Figure 25.--The central meteorological station.

During the early years of the project, records from a Colorado type pan and from a U.S. Plant Industry pan were also maintained.

Wind movement in miles per day was measured by a cup anemometer at the evaporation pan at a height of two feet and at the top of an adjacent tower at a height of 10 feet. For part of the winter months wind speed was measured only at the tower, as snow drifts and drifting snow interfered with the operation of the lower instrument. When wind speed at the lower elevation was required for the periods when the lower anemometer was not in operation, a value was computed by multiplying the value of the tower instrument by 0.62. This factor was derived by regression analysis of the values for periods when both instruments were operating.

Records for an automatic recording raingage and a standard raingage were also maintained at the met station. From time to time, other data was also collected at the central station for specific purposes. For example, beginning in 1946 a comparison of the catch of shielded and unshielded precipitation gages was made.

Personnel responsible for making the daily observations and checking automatic instruments were well trained and conscientious. There were very few changes in the personnel during the life of the station. The quality of the records should range from good to excellent.

Climatic Data

Table 34 presents the mean monthly air temperature at the central met station for the period of 1939 through 1967. The entries are the average of the daily means; the daily means were obtained by averaging the maximum and minimum temperatures as obtained by observations made with the maximum and minimum thermometer. The daily values for the period of 1939 through 1945 are available in tabular form in the files of the Hydrologic Data Laboratory.

Table 34.—Mean monthly air temperature in degrees Fahrenheit for period of record

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.
1939					66.8	71.4	80.9	74.3	71.9	55.1	41.5	34.5
1940	8.1	23.7	37.7	49.3	59.2	72.1	80.0	73.8	69.6	60.0	33.7	29.4
1941	24.7	26.3	32.4	50.8	63.8	68.5	76.4	74.7	66.6	53.2	38.6	30.4
1942	24.3	26.2	38.3	52.9	58.1	68.2	77.2	72.6	60.8	54.2	39.2	25.7
1943	21.3	34.0	32.9	53.3	56.1	70.8	77.1	79.2	64.0	53.4	36.4	26.4
1944	30.0	28.6	28.8	42.5	63.5	71.0	74.7	75.2	65.0	55.3	40.9	25.5
1945	28.6	30.9	46.0	47.0	55.1	62.6	73.2	75.1	65.8	52.8	41.9	23.8
1946	29.4	36.2	49.4	56.0	54.5	72.5	75.9	72.5	63.3	52.2	39.3	33.9
1947	29.7	27.2	34.6	45.7	55.4	66.6	73.5	81.1	70.6	63.0	34.7	29.0
1948	23.0	24.8	31.1	56.3	61.0	70.1	75.1	76.2	71.1	54.6	38.0	25.9
1949	13.2	19.8	34.6	50.3	61.8	70.6	77.0	74.2	61.5	54.6	46.6	28.5
1950	20.7	30.0	33.5	45.7	58.1	71.1	70.9	70.0	64.1	58.5	35.6	28.2
1951	22.6	30.9	32.1	46.0	61.3	65.0	72.4	74.0	60.4	52.4	35.7	24.4
1952	27.4	35.1	32.4	48.9	60.5	78.6	76.7	74.5	68.8	51.7	38.9	25.1
1953	27.0	34.2	42.5	45.8	59.6	75.6	77.6	77.2	68.9	59.1	39.1	30.7
1954	21.8	41.5	35.6	54.4	56.5	74.5	83.3	76.2	72.2	53.1	44.9	32.8
1955	23.9	19.9	35.1	54.8	64.4	66.9	81.4	79.7	68.3	54.0	32.3	20.5
1956	21.0	23.5	37.0	43.7	62.5	74.8	74.7	74.7	67.4	59.2	37.3	31.0
1957	15.9	32.4	36.9	46.6	58.1	69.0	80.3	77.2	64.4	54.6	37.7	37.4
1958	27.1	23.6	26.4	48.3	63.2	68.4	72.2	73.9	67.8	56.0	41.8	27.4
1959	19.7	23.7	38.8	49.0	62.1	73.1	73.0	79.6	65.2	49.5	32.5	35.4
1960	18.5	19.4	23.3	53.1	60.1	68.2	73.6	74.7	68.3	55.7	39.5	27.4
1961	24.5	32.1	38.9	45.7	57.2	70.3	75.7	73.9	61.2	53.8	36.8	19.6
1962	18.7	28.1	30.9	50.3	68.4	69.5	73.1	73.7	61.7	56.2	40.4	29.3
1963	13.7	30.8	41.6	53.7	62.0	75.0	77.7	74.8	66.7	62.4	42.1	20.8
1964	28.7	26.7	33.9	51.2	65.1	69.7	79.5	71.0	64.7	53.7	40.4	25.0
1965	23.6	20.7	25.9	51.7	63.7	68.7	74.2	72.0	57.3	55.9	41.6	32.8
1966	16.9	24.6	41.1	45.4	60.4	70.6	79.9	70.9	64.3	54.2	38.4	25.5
1967	23.7	29.0	42.0	52.7	56.2	66.2	72.0	71.0	61.8	52.1	38.1	28.3

Table 35 presents, for the period of 1939 through 1967, the mean monthly dew point temperatures, the entries being the average of the average daily values. Average daily values of dew point temperatures for the period through 1945, as well as hygrothermograph charts, are available in the files of the Hydrologic Data Laboratory.

Table 36 presents, for the period of 1939 through 1967, the mean monthly evaporation from the Class A evaporation pan, for the frost free months. The monthly values are the sum of the daily observations. The daily observations for the period through 1945 are available in the files of the Hydrologic Data Laboratory.

Table 37 presents, for the period of 1939 through 1967, the monthly wind speed in average miles per day as recorded at the two foot level. As noted above, the data for part of the winter months is estimated by reference to the anemometer at the ten foot level. The daily total values for both elevations for the period through 1945 are available in the files of the Hydrologic Data Laboratory.

Table 35.—Mean monthly dew point temperature in degrees Fahrenheit for period of record.

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.
1939					52	59	60	58	49	36	26	19
1940	4	19	28	36	44	54	57	59	52	44	28	25
1941	21	22	27	45	56	62	66	64	58	46	32	25
1942	19	22	31	45	51	61	65	62	52	42	30	21
1943	15	24	22	34	43	59	62	58	44	34	22	14
1944	20	21	21	36	53	59	61	61	52	41	31	19
1945	22	25	33	38	46	54	61	60	48	36	26	16
1946	19	18	31	36	40	49	54	54	49	40	27	20
1947	14	14	24	35	40	56	56	53	44	39	24	22
1948	13	17	21	31	42	54	59	54	44	24	25	18
1949	6	13	27	32	51	57	58	48	38	33	17	12
1950	5	14	14	19	40	46	54	55	45	32	15	12
1951	13	17	19	28	44	53	57	59	42	37	19	12
1952	12	19	21	33	53	69	66	67	54	36	32	20
1953	24	28	32	36	49	65	66	65	56	50	31	26
1954	15	31	23	42	49	63	67	67	57	45	34	26
1955	19	16	29	44	54	60	70	66	58	46	24	15
1956	16	19	30	34	53	65	65	63	50	43	29	22
1957	10	23	30	41	49	59	70	67	55	47	32	27
1958	22	19	23	41	55	61	66	64	55	39	28	18
1959	13	18	28	34	54	62	60	64	52	38	19	25
1960	14	15	19	40	47	59	63	62	55	42	24	20
1961	13	26	32	33	49	62	64	64	52	43	31	14
1962	15	23	25	39	60	62	66	64	55	48	32	21
1963	8	22	30	35	50	63	64	60	58	48	32	13
1964	16	18	22	41	50	59	59	57	54	37	29	17
1965	17	15	18	44	51	61	61	57	50	46	30	21
1966	11	17	30	34	46	59	69	62	55	41	29	18
1967	17	18	29	42	46	60	64	59	53	41	27	19

Table 36.--Monthly class A pan evaporation in inches per day for period of record.

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DE.
1939					.38	.40	.52	.38	.51	.29		
1940				.21	.37	.40	.55	.28	.39	.25		
1941				.25	.35	.34	.40	.36	.33	.28		
1942				.28	.28	.28	.35	.32	.21	.23		
1943						.34	.35	.27	.28	.61		
1944					.22	.31	.30	.34	.23	.19		
1945					.22	.30	.36	.32	.42	.21		
1946				.34	.21	.37	.38	.28	.18	.15		
1947				.21	.25	.24	.30	.48	.44	.26		
1948				.33	.31	.35	.35	.38	.37	.24		
1949				.24	.28	.32	.38	.35	.25	.20		
1950					.33	.41	.30	.28	.22	.23		
1951				.25	.28	.24	.29	.29	.20	.15		
1952				.22	.30	.48	.40	.30	.35	.25		
1953				.22	.32	.39	.42	.45	.39	.27		
1954				.31	.22	.43	.53	.33	.38	.14		
1955				.36	.44	.29	.56	.54	.41	.21		
1956				.29	.34	.46	.39	.42	.43	.32		
1957				.22	.22	.30	.35	.36	.24	.16		
1958				.19	.26	.31	.30	.30	.26	.22		
1959				.25	.28	.38	.33	.40	.28	.16		
1960				.30	.30	.31	.32	.38	.30	.16		
1961				.30	.25	.32	.35	.29	.23	.18		
1962				.21	.36	.33	.35	.36	.20	.17		
1963				.21	.29	.41	.39	.35	.24	.21		
1964				.25	.39	.41	.43	.35	.21	.22		
1965				.23	.30	.25	.32	.25	.14	.16		
1966				.24	.36	.35	.39	.25	.21	.21		
1967				.25	.29	.26	.26	.29	.20	.15		

Table 37.—Monthly wind speed at pan height in miles per day for period of record.

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.
1939					177	172	143	141	201	172	130	133
1940	190	159	179	232	167	170	200	144	179	168	133	138
1941	142	152	171	227	152	147	105	112	171	136	132	157
1942	151	133	178	196	161	137	122	122	121	106	153	211
1943	171	158	186	177	144	152	125	116	138	126	137	149
1944	143	138	179	190	181	164	115	121	130	105	133	142
1945	128	144	167	209	181	134	120	121	163	138	161	187
1946	154	163	183	165	164	191	127	113	154	170	160	150
1947	165	200	173	178	170	134	104	140	164	147	155	124
1948	146	149	173	215	156	134	123	113	139	146	163	135
1949	175	151	155	174	158	122	107	110	123	170	141	149
1950	158	135	187	205	175	160	112	98	105	151	154	142
1951	148	163	211	250	164	105	100	96	117	138	136	153
1952	131	130	192	171	144	169	141	106	118	116	142	133
1953	130	149	181	190	189	154	172	152	151	136	143	175
1954	167	182	185	205	138	175	132	124	154	136	142	157
1955	154	162	178	202	175	142	152	123	163	149	158	120
1956	154	144	199	187	166	138	90	110	132	161	188	150
1957	155	147	176	173	123	104	91	101	112	136	141	143
1958	131	162	121	151	99	118	89	68	119	100	139	132
1959	148	143	190	175	145	132	92	112	110	121	161	150
1960	149	167	173	204	144	117	81	122	113	108	144	148
1961	131	114	173	180	158	105	99	95	144	130	151	151
1962	165	170	164	183	221	119	84	101	97	111	129	137
1963	155	167	224	179	143	163	122	103	102	101	143	163
1964	163	176	232	192	160	143	119	113	110	105	123	132
1965	101	121	183	160	142	137	138	86	110	114	110	141
1966	130	117	209	154	154	151	112	96	92	126	130	117
1967	155	169	201	187	151	132	69	82	89	129	99	137

AN ASSESSMENT OF THE CONTRIBUTIONS MADE BY THE HASTINGS PROJECT TO THE FIELD OF HYDROLOGY

The major contributions coming from the investments of resources in the Hastings project are discussed as 1) those made directly by the project personnel, and 2) those made through the use of the Hastings data by others. The distinction is somewhat a matter of convenience, but it is helpful in making the point that the data is still useful, in fact may be potentially of more use now than it was during the active period of the project.

Contributions of the Project Personnel

Watershed research, of the type done at the Hastings project (4)^{1/}, requires expenditure of a major effort and of several years of time before enough data is at hand to begin drawing conclusions. The selection of the specific research area, preliminary investigation of the selected watershed and its sub-watersheds, planning of the experiments, design of the hydrologic measuring systems, and installation of measuring equipment may well require two or three years, and another year may be required to establish the cropping systems on the watersheds. Soils and topographic surveys should be made before the final selection of the sub-watersheds, but this must usually be delayed until after the experiments are actually begun.

The physical operation for establishing and operating an experimental watershed is a sizeable one, requiring heavy earth moving equipment, trucks, farm machinery, a water supply, buildings, roads, and an organization to operate and maintain them. After the planning and construction period is over, the task changes to one of careful and continuous attention to the collection of the records.

^{1/} Figures in parentheses refer to Publications List at end of this section.

The collection of good records must be a first major objective of the watershed researcher. Measuring stream flow is not simply done: streams shift, aggrade, and degrade, changing the stage-discharge relationships; flumes silt up and freeze up; delicate instruments fail because of heat, cold, moisture and dust. Measuring precipitation, sediment, and soil moisture are subject to the same type of hazards and problems. Changes in land ownership, crop failures, and fluctuating budgets upset the hoped-for continuity of the studies: and the weather usually seems to be uncooperative. Unless all of the personnel of the project view the data collection as their first challenge, good data will not result. The satisfaction that comes from collecting a file of accurate and dependable data under adverse conditions must be equivalent to that which comes from a successful research analysis (though not as well rewarded).

The personnel of the Hastings project recognized the value of accurate data. Their major contribution to hydrology is 30 years of good runoff, precipitation, sediment, soil moisture, and land use data. An analysis of data, no matter how elegant, may be proven wrong the next year. Good records never lose their value.

During the first few years of the Hastings Experimental Watershed project, plans were made to publish, annually, all of the detailed hydrologic and related land use data collected at that and the other experimental watershed projects (Coshocton in Ohio and Riesel in Texas). The data was to be published in a special USDA series of Hydrologic Bulletins. One such Bulletin (47) for the Hastings project, containing the data for the initial period of 1938-40, was issued, but with the advent of World War II, publication of the series ceased. Although field drafts of the Hastings bulletins for all of the war years were completed, none of the bulletins were ever published. Copies of these bulletins through 1945, are on file in microfilm with the Hydrologic Data Laboratory.

In 1955, funds were made available to permit limited publishing of the backlog of data. Summaries of monthly precipitation and runoff (1), annual maximum discharges (2), and complete data for selected storm events (3) for all of the small experimental agricultural watersheds in the United States were issued. Thereafter, the same three types of data were published on a more or less annual basis (16, 29, 30, 31, 32). The data for the Hastings project, extracted from these documents, is given in Appendix A.

The research findings of the people who were employed at the project added to the broad field of hydrologic knowledge in several specific areas. It will be noted in the following paragraphs that the research results mentioned are all of a problem solving nature. The people at the project were in close touch with those in SCS and with farmers and farm advisors who had real and immediate soil and water problems. There was an understandable tendency for the research people to be concerned with the solution to these real problems—rather than with what has come to be known as basic research. Too, the daily involvement with full scale farm operations on real farm lands influenced them toward the practical and away from the theoretical.

At the time the Hastings project was established, many conservation-minded people, both laymen and professional, believed that very large reductions in runoff would result if the proper conservation measures were applied to watershed lands. They believed, sincerely, that wide spread application of the land treatment measures could eliminate the need for large flood control dams. Controversy between supporters of land treatment measures and supporters of large dams was intense in the tiers of states from Montana, Dakota, and Minnesota to Texas.

The inference that had to be drawn from the early runoff data from the Hastings small watersheds was that the application of standard conservation measures on the lands of even a creek-size watershed would produce relatively small and undependable reductions in flooding on the main stem of the creek watershed; and that the flood reductions to be expected on the main stems of large watersheds would not be significant. These early inferences were not reported in the technical journals. They became known, however, through occasional visits and discussions with the research project personnel, by those who were responsible for technical leadership of the USDA program being carried out under the authority of the Flood Control Act of 1936.

A change in thinking as reflected and some change was reflected in the reports (called Survey Reports) of the studies of flood damages and programs to alleviate them. In the years before World War II, the survey reports had included only measures such as contour farming, terracing, crop rotations, and changed land use. The studies of flood damages and flood control programs were discontinued during the war years, but the research at Hastings was maintained. After the war was over, the flood control studies were started again. But, in the meantime, the data that indicated the magnitude and dependability of reduction in runoff that could be expected to occur from land treatment had become available. The list of recommended measures for alleviating flooding was now expanded to include small flood control dams and reservoirs as the major measure for upstream flood control. The changes in thinking and program recommendations in large measure were due to consideration of research data that had been collected during the war years.

Information for Hydrologic Design of Conservation Structures

As soon as a bare minimum of data had accumulated from the hydrologic research projects, the SCS Research Division began issuing a series of publications for the hydrologic design of conservation structures. The publication for the Central Great Plains of Nebraska and Kansas, by Allis, was issued in 1948 (5). This Technical Publication (TP), the recommendations of which were based on eight years of hydrologic data from the Hastings project and some U.S. Geological Survey data for larger streams, presented the expectancies of peak rates of runoff from watersheds of up to 10,000 acres in area. The publication pointed out that peak rates were influenced by channel storage and presented a procedure, based on the amount of channel meander, for adjusting the peak rate indicated for the given area of watershed.

At the time of publication of this document, there was not sufficient data at hand, using the procedures selected for the TP series, to determine the magnitude of effects of conservation measures on peak flows. Later studies, in which the conservation-treated watershed W-5 was compared with the prevailing practice watershed W-3, seemed to indicate a substantial reduction in peak flows due to the conservation treatment (8, 9).

The project personnel did not pursue the investigation of a procedure to take this probable reduction into account in predicting of peak rates of runoff, probably because the "Hydrology Guide" had more or less obviated this need.

Bridging the Gap

The general research approach to the problem of estimating volumes of storm runoff from ungaged agricultural watersheds was, first, to evaluate the efforts of the various physical characteristics of the land and its use and treatment by means of hydrologic measurements on small single-soil single-cover watersheds. (On the Hastings project, these were the 4-acre watersheds.) The findings from the small watersheds would then be used to synthesize the storm runoff volumes to be expected from larger ungaged watersheds having complex patterns of natural and man-made characteristics.

It was known that, in most climatic regions, the volumes of runoff from the small "unit source areas" in a complex watershed could not simply be summed up to obtain the runoff from a large complex watershed—a gap remained. And so studies relating to the development of a procedure to use the results of small watershed research in a system to make storm runoff estimates for complex watersheds became known as studies for "bridging the gap".

Hastings data was used by Allis et al (11,13) to explore the problem, and to suggest an operational procedure for dealing with it in the area of which the Hastings watersheds were generally representative.

The approach used was to compare the measured storm runoff, storm by storm, from the three large watersheds, W-3, -8, and -11, with a computed volume developed from the small watershed data, modified by consideration of the variations in rainfall over the watershed areas. It was shown that, for this climatic and physiographic area, substantial "transmission losses" occurred from the time runoff was generated on the land surface to the time the water reached the outlet of the watershed; and that these losses, per unit area, increased as the size of the watershed increased, up to about 5,000 acres. This straightforward study provided some understanding of the nature of the "gap" as well as a useful tool for "bridging the gap", that is, from the small unit source watershed data to larger areas. The information also provided input to the Cooperative Water Yield Procedures Study to be described later.

Effect of Pasture Management Practices on Runoff and Vegetation

At the time of establishment of the Hastings project there was great interest in, and need for, improvement of pastures. The drouth of the thirties had resulted in severe deterioration in both condition and species of grass cover.

The two measures being considered for pasture improvement in the area were pasture furrowing and reduction of grazing intensities. The experiment was designed to evaluate the effects of each of these practices on both runoff and the grass cover on the watersheds.

At the end of the period of 1939 through 1945, the results appeared conclusive and the experiment was modified to include the evaluation of narrower spacing between the furrows and of eccentric disking. The eccentric disk created a series of shallow basins on the surface of the pastures.

All treatments reduced runoff effectively (24). On-site surface runoff was reduced and soil water was increased by light versus heavy grazing, by contour furrowing versus no treatment, and by eccentric disking versus no treatment. The resulting increase in soil water, however, did not produce better stands of perennial grasses.

During the course of the experiment, especially in the first phase, rangeland specialists and other conservationists had inspected the plots from time to time and it was soon obvious to them that the furrowing was having little if any effect on recovery of the pastures. The Hastings pasture plot experiment accounts, to some extent, for the fact that the ineffective practice was not applied to pastures in the general area.

Hydrologic Effects of Conversion of Croplands to Grassland

Over a million acres of marginal cropland in the Great Plains have been converted to permanent vegetation in recent years as a result of Federal conservation programs, and this is only 10 percent of the conversion recommended by conservationists. The experiment established at the Hastings project to assess the hydrologic effects of the conversion showed that the on-site runoff from the converted lands would be significantly reduced (25,41). In the third year of the tests, the runoff from the newly converted grassland watersheds was about equal to that from native meadow watersheds that had never been plowed. Conversely, runoff from a small watershed that had always been in native meadow increased after the watershed was placed in cultivation, approaching that of long-cultivated watersheds after a few years of cultivation.

Because of the termination of the project, the experiment could not be continued to completely evaluate the period of time necessary to achieve maximum effects of the land use changes. The direction and general magnitude of the results, however, do not appear to be subject to question. If croplands areas, in the amounts recommended by conservationists, are ever converted to the condition of these ungrazed grasslands, there would probably be significant reduction in the surface runoff from some watersheds.

Sediment Studies

Studies of the sediment characteristics of the experimental watersheds were not initiated until 1957. There had been no lack of recognition of the severe erosion hazard and high sediment yields of watersheds in this area of loessial soils. There was, however, a lack of resources to expand the research at the project into a new field.

Adjustments made in the program in 1957 permitted establishment of very modest sediment studies. The physical additions to the existing program involved primarily the collection of sediment data at the gaging stations of watersheds W-3 and W-5, and the equipping of a small laboratory for analyzing the sediment samples. Preparations for the studies were carefully planned and documented by Dragoun (21). This report provides a valuable reference for those starting sediment studies on watersheds.

The runoff, precipitation, land use, and other data available at the project, along with the new sediment data, permitted an exploration of the usefulness of the rainfall energy factor in predicting the sediment yield of watersheds. It had been shown by Wischmeier and Smith ^{1/} that this factor, the product of the total rainfall energy of a storm and its maximum 30-minute intensity, was the best single variable for predicting soil loss from small cultivated fallow plots when factors other than rainfall were constant. Dragoun (22) tested several expressions for the rainfall energy-intensity factor and found that multiplying the factor by a term for antecedent moisture improved its predictive value for watersheds. Dividing the storm data into seasons also improved the correlations.

^{1/} Wischmeier, W. H. and Smith, D. D., Rainfall energy and its relationship to soil loss, Trans. Am. Geophys. Union, 39(2), 285-291, 1958.

The sediment studies and analyses for most of the period of record are well summarized by Dragoun and Miller (23). The land form features of watersheds W-3 and W-5 were examined as one element in the establishment of their comparability in regard to potential sediment yield. The various features, such as stream order factors and hypsometric functions, were found sufficiently comparable to indicate that measured sediment yields could not be attributed to variations in land form. The comparison of the sediment yields of the two watersheds, W-3 conventionally farmed and W-5 farmed with conservation practices, clearly illustrated that a reduction of 50 percent or more in sediment yield could be achieved. The construction of two small reservoirs in the upper part of watershed W-5, in 1962, negated direct comparison of the two watersheds thereafter.

Miscellaneous Research Findings, Observations and Summaries

Occasionally, research findings or observations not resulting from strict pursuit of the formal research objectives were made. Also there was interest, among many lay people and practicing conservationists, in the progress and summarized results of the research. Examples of reports on items of this nature follow.

Accuracy of rain gages: One of the problems of hydrologic research that never seems to be resolved is that of the accuracy of the precipitation measurements, and many research stations have made simple comparisons of rain gages. At Hastings, a comparison of five different gage installations having records of 15 years was made (12). The comparison did not establish whether or not the true precipitation was being accurately sampled. It did establish that, except for periods when the precipitation occurred as snow, the differences between the catches of the gages were insignificant for the purposes for which the data were being used.

Observations on crops and crop yields: Though the objectives of the research did not include consideration of the effect of conservation practices on crop yields, the experimental set-up provided an opportunity to make observations of the yields. In most years, the yields of the crops on the small watersheds were estimated by sampling or by measurement of the total production of each watershed. The information was often included in annual reports that were distributed to Soil Conservation Service Regional or State Offices and to the Nebraska State Agricultural Experiment Station. Occasionally, such information was published (7). The fact that the conservation treated watersheds quite consistently out-yielded the conventionally farmed watersheds provided an important argument for those having responsibilities for promoting conservation farming.

The trends in crops grown by the farmers on the large watersheds, and presumably in the general region, can be noted from the annual crop inventories (42). The most pronounced changes during the period of record were of milo grain sorghum almost completely replacing corn as the major feed crop and a large increase in summer fallow.

Summaries of progress and findings: There is need for the general progress and the summary of results of research to be reported from time to time. This serves to notify those who make use of research findings that they may or may not need to take the finding into account in their operations, and it serves also to notify other research people of the degree to which the particular field is receiving research attention. Reports of this nature were often given and occasionally published (4, 6).

Another summary (10) sets out concisely the results of the 9-year (1946-1954) study of the effects of different crops and cropping practices on water yields and peak flows from the 4-acre watersheds. That brief report was published in a journal having readers among a very broad group of individuals having a common interest in conservation.

A general summary presented findings from watershed studies from the projects at Hastings, Coshocton in Ohio, Treynor in Iowa, and Riesel in Texas (31). Presented to a mixed group of agricultural engineers, the summary took a broad look at the effects that land use had on water flow and sediment yield in the four acres.

Potential Contribution of the Hastings Project Data to other Hydrologic Studies

Administration policy of the ARS has limited the availability of the hydrologic data from a project primarily to those persons directly involved in the operation of the project. The policy has stemmed from the belief that the individuals who expended the effort in planning, establishing, and operating the project are entitled to the fruits of their labors, these being exclusive use of the data they collect, and the opportunity to analyze it and publish their findings. As applied to an experiment that produces its data in periods of a few days to a very few years, the policy is not challengeable. But the Hastings type of watershed research, dependent on a kind of sampling of the range of climates and requiring years just to establish, introduces problems in reference to this policy. The policy has been seriously questioned by non-federal hydrologic research people.

In the case of the Hastings data, this question is a moot one, for all of the data are now being made available to any interested person or organization, requiring payment only for the costs of retrieving and reproduction.

Paradoxically, the data now being made available to anyone interested is more amenable to analysis than it ever was to the project employees. The advantages of having substantially all of the hydrologic data in form for computer input are obvious. Also, the computerization required an additional inspection of the data, which resulted in elimination of some errors and in a uniformity of format. Critical assessment of the data has resulted in filling in some gaps and in organizing some of the pieces of data that may not have been of high priority to the researcher on the project. It can safely be said that the hydrologic data now available from the Hastings project is better and more useful data than was available to the on-the-spot researchers during the 30 active years of the project.

Probably, the data is only now approaching the time when it can be of the most use. The potential use can be illustrated by several examples of studies made by individuals who were not employees of the project, but who extracted data from the data release series or obtained some data because of their close association within organizational units.

The Hydrology Guide of the Soil Conservation Service

Increased interest of the U.S. Department of Agriculture in watershed hydrology arose from the responsibilities assigned to that Department by the Flood Control Act of 1936 ^{1/}. Under the authority of the 1936 act, the SCS and the Forest Service initiated surveys of the flooding and flood damages in upstream flood plains and of the potential reductions in flooding and flood damages that would be brought about by the application of conservation measures on the lands of the upstream watersheds. The establishment of the watershed research projects at Hastings and at other locations by the SCS Research Division was in response to the need of the SCS Operations Division for information that would be useful for estimating the "without program" flood flows from ungaged upstream watersheds and for predicting the "with program" flood flows that could be expected when conservation measures were applied to the watershed lands.

The new program of flood control surveys and investigations had some difficulty in getting underway, one of the principle reasons being that there were no generally accepted procedures for making the necessary hydrologic estimates. Only limited headway in the program had been made when the United States became actively involved in World War II, at which time the program was placed on a standby basis. However, small amounts of funds were made available to the Research Division to permit the hydrologic research projects at Hastings and the other locations to maintain the experimental watersheds and collect the hydrologic data. Thus, at the end of World War II, about seven years of hydrologic data, reduced and well organized, were available from the studies at Hastings.

^{1/} Subsequent legislation changed various aspects of the responsibility of the USDA in flood control activities, but did not change the basic requirements for sound hydrologic procedures.

The data contributed substantially to the procedures for making the hydrologic estimates required by the SCS program of flood control surveys and investigations that was revived and expanded at the War's end. The development of the procedures was due largely to the efforts of Victor Mockus, the hydrologist who had also been largely responsible for collecting, reducing, and organizing the Hastings data during the period of 1942 to 1946. Soon after the war ended he became a hydrologist with the Operations Division of SCS where his assignment was to devise the new and adapt the existing hydrologic procedures required by the upstream program. The assembled procedures are commonly known as the "SCS Hydrology Guide", the first edition of which was issued in 1954, the latest one of which was issued in 1971 (40).

To say that the development of the "Guide" procedures would not have been possible without the Hastings data is an overstatement. However, substantial use was made of the data. The data from the network of rain gages were used in various studies of rainfall distribution characteristics. The small watershed and pasture plot data were used to develop the land use and treatment classes, in determination of "curve numbers" for hydrologic soil-cover complexes, and in development of the concept of rainfall-runoff relationships represented by the curves. The records of rainfall and runoff for both the large and small experimental watersheds entered into the devising and testing of procedures for estimating lag time and time of concentration and for constructing dimensionless hydrographs. Entering into the development of the procedures, also, was the experience of working with the data and observing the hydrologic processes of real rain, real land use and treatment, and real runoff at the Hastings project.

The procedures of the Hydrology Guide are the basis for carrying out the hydrologic studies of a multi-million dollar national program of upstream water control, and many other countries have adopted the procedures for their use. Thus, the Hastings project made a worthwhile contribution to the programs for the development of the soil, vegetative, and water resources of upstream watersheds.

Cooperative Water Yield Study

It has long been conjectured that the use of the land affects the amounts and timing of water yielded by stream flow. In 1957, the Bureau of Reclamation, Soil Conservation Service, and the Agricultural Research Service initiated a five-year joint study of this problem. A party of three experienced hydrologists, one from each agency, was established at Lincoln, Nebraska to develop and test procedures for evaluating the effects of watershed treatments on the yield of stream flow (43). The study, lasting seven rather than five years, was probably the most concentrated and careful effort ever made to that time to gather together, evaluate, and analyze all of the data bearing upon the subject.

The Hastings data, which were derived from experiments that had objectives much in common with those of the cooperative water yield study, and which were collected in a water-short region, were used extensively by the study group.

It was concluded from an analysis of the small watershed data from Hastings and other research projects that certain land treatment practices did reduce on-site surface runoff, particularly in dry years. The results of the analysis were incorporated in the procedure developed by the study group in the form of indexes for various types of land treatment practices, the indexes being indicative of the on-site depletion to be expected from various practices. In the more arid areas, which are where the water yield problem is of most concern, unit area on-site runoff is greater than unit area down-stream runoff. The difference is referred to as "transmission loss". The Hastings watersheds, ranging in size from four to 3490 acres, provided input to the procedure for estimating the transmission losses from the point where runoff is generated to the down-stream point of interest.

During the course of the study, the group explored and tested many of the commonly accepted methods of analysis that have been considered to be effective in detecting changes in stream flow that may have been brought about by changing conditions in the watershed (44). The methods tested included double mass curves, analysis of variance, and regression analysis, including orthogonal transformations. The precipitation, runoff, and soil moisture data for small watershed 3-H were used in the examination of the use of orthogonal transformations in multiple regression (30); data for 763 storm events occurring on watershed 3-H were computerized and used in the study. It is of interest to note that none of the analytical methods investigated produced results that were very helpful in the development of the procedure for estimating the effect of land treatment on the yield of stream flow.

Use of Data by USDA Hydrograph Laboratory

The USDA Hydrograph Laboratory is a small group of people, stationed at Beltsville, Maryland, with specialized competence in meteorology and climate, soils and vegetation, hydraulics, hydro-geology, and watershed hydrologic systems. They collect no data on continuing basis, relying almost solely on published data and the good will of other organizations and units for their basic hydrologic information. The use made of the Hastings data by the USDA Hydrograph Laboratory illustrates especially well the potential value of the Hastings records. A major objective of the group has been to develop a mathematical model describing the hydrology of watersheds and ultimately useful for predicting the change in the hydrologic regimen of watersheds if the climatic or physical characteristics of the watershed were to change or to be changed.

Their model, called the USDAHL-70 Model, treats watershed hydrology as a distributed rather than a lumped system and deals quantitatively and sequentially with components in the hydrologic cycle as they occur on watersheds. It is dependent upon specific numerical characterization of watershed response parameters in advance. The aim of the model is to use available or easily obtained information on soil, topography, and characteristics of the stream channel system, along with various land use patterns and treatments, to predict the flows that would be generated when the watershed is subjected to a storm or series of precipitation events. The proving of the model requires careful testing on complex watersheds having the necessary basic surveys and records of land use and treatment, precipitation, and water flows.

The data of the Hastings project, along with those of other ARS experimental watersheds, were used extensively in the development and testing of the model (27, 36, 37, 38).. One of the concepts explored and tested with the Hastings data was that of relating the hydrologic properties of the soil to its topographic position (26). Here the available soil and topographic maps were used with hydrologic information to establish that, for hydrologic purposes, the soils could be classified into soil-land form units of upland, hillside, and bottom land. This was a significant contribution to the success of the model, for it permitted classifying soils in a system compatible with the down-hill flow of water. Flow generated on an upland unit would be subjected successively to the effects of the hydrologic characteristics of hillside and bottom-land units as it travelled to the channel.

The model, programmed in Fortran, was tested by comparing the computed runoff for various periods, from individual storm events to a series of years. For example, the computed five year water yield of watershed W-11 was 17.98 inches compared with the observed yield of 19.01. On a monthly basis the correlation coefficient r for the 60 months of the period was 0.93. The work on the model is being continued.

Testing of Mathematical Models and Analyses Techniques

The use of experimental watershed data for testing hydrologic mathematical models is also well illustrated by the work of Smith and Woolhiser (45, 46) in their mathematical simulation of infiltrating watersheds. In this study a physically based overland flow model was combined with an infiltration model derived from soil moisture flow theory to produce a first approximation to a physically based theoretical model of an infiltrating watershed. The mathematical model was tested by comparison with data from a 40-foot laboratory soil flume fitted with a rainfall simulator and with storm rainfall and runoff data from pasture plot 56-H of the Hastings project. Good agreement was obtained between measured and predicted hydrograph, although there were some differences in recession lengths.

In the development and testing of a system for fitting a mathematical function to single-peaked hydrographs, Brakensiek (14, 15) used storm runoff data from several of the Hastings watersheds, along with like data from other experimental watersheds that had been released in ARS publications. The fitted function was similar to the gamma function except that it had only one parameter. Two values of the parameter were estimated, one for the rising and one for the falling side of the hydrograph. A computer program was written to automate the fitting procedure. The system was tested on 135 storm runoff hydrographs from the Hastings and other experimental watersheds. For cases of essentially pure single peak hydrographs not sustained by early or late bursts of rainfall, the function produced good to excellent fits in 75 to 80 percent of the cases.

The availability of the Hastings hydrologic data in form suitable for direct computer input will greatly reduce the effort involved in studies such as this that require considerable testing.

Measurement of Precipitation

Data from the rain gage network of the Hastings project along with data from other dense networks was used by Hershfield (28,29) to investigate criteria for establishing networks. As a first approximation to the spacing of gages he presented a graphical solution in which the distances between gages was a function of the 2-year 24-hour rainfall and the 2-year 1-hour rainfall. He also noted that the direction of rain gage distribution is often more important than gage density in defining the characteristic dimension of rainfall distribution. Even though only 15 storm events from each of the networks were used in the study, considerable effort and resources were required, because the data had not yet been computerized.

Use of Data for Theses

The project was a hundred miles from the University of Nebraska at Lincoln and there could be little day-to-day contact with the graduate schools there. Inhibiting use of the data also was the administrative policy against the release of data. Some little use, however, was made of Hastings data. Jordan (39) used the soil profile data from one of the pits described previously under the topic of Soil Moisture Tension Data and Burgess (20) obtained several stereo pairs of the flood plain between gaging stations W-3 and W-11 to study flood susceptibility and flood frequency.

Under other conditions of location and policy, arrangements could have been made for a number of worthwhile thesis projects to have been pursued at the Hastings project. Such arrangements would have also provided for input of fresh viewpoints to the hydrologic research.

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MONTHLY PRECIPITATION AND RUNOFF, ANNUAL MAXIMUM DISCHARGES
AND VOLUMES OF RUNOFF, AND SELECTED RUNOFF EVENTS FOR THE
WATERSHEDS OF THE CENTRAL GREAT PLAINS EXPERIMENTAL WATERSHED

The tabular information in this Appendix was extracted from the data release documents previously mentioned and shown in the Publications List (1, 2, 3, 16, 17, 18, 19, 32, 33, 34, and 35), with the exception of the information for pasture plots 51-H through 58-H which were taken from the original field tabulations.

All the values in the various tables were derived from the raw data by manual methods. The data stored at the Hydrologic Data Laboratory were derived by computer analysis of the same raw data. Users of the data obtained from the Data Center may find slight differences in corresponding values, due to the different computational processes.

MONTHLY PRECIPITATION AND RUNOFF (INCHES)								WATERSHED W-3 (44.01)						
YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR	
1938 P Q								1.90 .18	1.94 .17	0.10 0	0.23 0	0 0	4.17 .35	
1939 P Q	0.28 0	0.15 0	0.56 .18	2.38 .10	1.84 .02	4.77 1.15	1.32 .03	2.17 .08	.03 0	.41 0	0 0	.20 0	14.11 1.56	
1940 P Q	.25 0	.44 0	.52 .02	1.04 0	2.35 .10	1.33 .08	.35 0	1.57 .01	1.47 .02	1.15 0	1.41 0	.46 0	12.34 .23	
1941 P Q	.39 .01	.39 .05	.20 .17	3.38 .08	1.84 .05	8.12 1.84	1.44 0	2.60 .04	2.44 .01	2.74 .26	.92 .08	.63 0	25.09 2.59	
1942 P Q	.05 .07	.56 0	1.79 .10	3.66 .16	2.63 .02	8.05 1.90	1.77 .02	4.57 .61	6.45 1.12	.33 0	.10 0	1.09 0	31.05 4.00	
1943 P Q	0 .03	.68 .40	.15 .01	2.48 .12	1.74 .02	5.90 1.43	2.31 .08	1.38 0	.06 0	.58 0	.10 0	.14 0	15.52 2.09	
1944 P Q	.88 0	.17 0	1.05 0	4.59 .30	5.59 1.33	3.70 .27	1.81 0	7.64 1.15	.67 T	.77 T	1.55 0	.05 0	28.47 3.05	
1945 P Q	.32 0	.41 0	.54 0	3.17 .04	3.95 .38	3.71 .80	3.76 .41	1.21 T	2.73 T	.34 0	.04 0	.99 0	21.17 1.63	
1946 P Q	.51 .10	T 0	1.56 0	.22 0	2.84 0	2.85 .05	3.59 .18	3.95 .35	5.94 1.36	4.13 .69	2.01 .53	.02 0	27.62 3.26	
1947 P Q	.41 0	.16 0	.62 0	3.77 .37	2.67 .13	5.59 1.64	1.65 .14	1.07 0	.34 0	.41 0	1.26 0	1.09 0	19.04 2.28	
1948 P Q	.09 0	1.12 0	.45 .15	.49 0	1.70 0	3.98 .37	4.15 .76	.88 0	1.07 T	.72 0	1.16 0	.33 0	16.14 1.28	
1949 P Q	.86 0	.45 0	1.64 .04	1.98 T	5.72 1.79	6.59 1.89	3.55 .56	1.02 0	1.75 0	3.04 .74	0 0	.16 0	26.76 5.02	
1950 P Q	.03 0	.51 0	.27 0	.68 0	3.80 .15	1.95 .17	5.23 1.31	2.24 .02	5.20 2.84	1.32 .59	.52 0	0 0	21.75 5.08	
1951 P Q	.36 0	1.61 .24	1.15 .04	3.16 .12	3.57 .46	9.66 4.73	6.05 3.33	3.45 .17	3.33 .54	1.87 .03	.51 0	.11 0	34.83 9.66	
1952 P Q	.22 .01	.56 0	1.55 .65	2.56 .14	2.96 .46	4.54 1.08	5.61 2.00	1.21 0	.41 0	0 0	.74 0	.93 0	21.29 4.34	
1953 P Q	.12 0	.74 0	1.03 0	2.07 T	3.16 .49	3.10 .88	1.45 0	1.53 T	1.40 0	.69 0	2.45 .05	1.24 .09	18.98 1.51	
1954 P Q	.04 0	.30 0	.24 0	1.70 .02	6.10 1.86	1.09 0	1.04 0	3.96 .07	1.51 .02	1.78 .03	.01 0	.51 0	18.28 2.00	
1955 P Q	.37 0	.34 0	.23 0	.86 0	2.69 .09	3.72 .40	.91 0	.56 0	4.66 .56	.17 0	0 0	.28 0	14.79 1.05	
1956 P Q	0.22 0	0.10 T	0.29 0	1.17 T	0.65 0	4.25 .79	2.61 .26	1.40 .07	1.26 .09	0.86 .03	0.09 0	0.05 0	12.95 1.24	
1957 P Q	.14 0	.06 0	1.75 T	2.92 .40	6.66 1.78	11.30 5.06	.18 0	5.32 .89	.52 0	1.31 0	.53 0	.15 0	30.84 8.13	
1958 P Q	.10 0	1.33 .02	2.20 .38	1.76 .13	1.50 0	2.81 .31	4.47 .30	3.72 .36	1.56 .02	.06 0	.44 0	.05 0	20.00 1.52	
1959 P Q	.27 0	.29 .15	3.58 .31	.86 .01	6.31 1.04	4.76 .83	2.93 1.80	2.99 .13	4.56 .72	1.83 .09	0 0	.08 0	28.46 5.08	
1960 P Q	0.73 0	0.67 T	1.25 1.87	2.10 .60	5.80 1.74	5.54 1.21	2.34 .03	1.23 T	3.25 .36	1.04 0	0.41 T	0.02 0	24.38 5.81	
1961 P Q	.08 0	.21 0	2.07 .02	1.43 .03	7.06 1.26	3.97 .72	2.61 .02	3.43 .49	3.60 .19	.48 0	1.10 .01	.59 0	26.63 2.74	
1962 P Q	.39 .12	.67 .01	1.88 .71	.47 .00	2.87 .02	4.75 .49	5.56 .98	4.52 .76	2.67 .18	1.89 .21	.17 .00	.40 .00	26.24 3.48	
1963 P Q	.32 T	.00 .15	1.52 .07	.94 .00	.57 .00	4.37 .30	2.30 .03	2.29 T	9.02 2.34	1.45 .14	.30 .00	.13 .00	23.21 3.03	
1964 P Q	T .00	.47 .00	1.38 .00	1.14 .00	1.13 .00	6.01 1.63	3.86 .55	5.63 1.20	1.70 .06	.08 .00	.52 .00	T .00	21.92 3.44	
1965 P Q	1.01 .00	1.37 .45	1.57 .35	2.06 .05	11.03 5.54	7.79 2.13	4.19 .51	1.62 T	4.32 .21	.45 .00	.14 .00	.57 .00	36.12 9.24	
1966 P Q	.05 .00	1.17 .13	.43 .00	.69 .00	.69 .00	3.08 .06	3.93 .60	1.76 .02	1.17 .00	.72 .00	.00 .00	.22 .00	13.91 .81	
1967 P Q	.12 .00	.15 .00	.13 .00	1.72 .00	4.66 .08	6.05 .80	2.70 .17	.46 .00	4.56 .27	1.26 .08	.10 .00	.50 .00	22.41 1.40	
AVG P Q	.30 .01	.52 .06	1.09 .17	1.93 .09	3.60 .65	4.92 1.13	2.89 .48	2.61 .22	2.67 .38	1.10 .10	.57 .03	.38 T	22.58 3.32	

Notes: Station records began August 1938, part year records for 1938 not included in station averages. Precipitation amounts are averages of amounts from individual gages for the years shown as follows: 1938 through 1961, gages are not documented; 1962 A-31-R, B-10-R, B-32-R, B-33-R, and B-36-R; 1963 B-31-R, C-31-R, D-31-R; 1964 through 1967 A-12-R, B-10-R, B-31-R and B-36-R.

MONTHLY PRECIPITATION AND RUNOFF (INCHES)							WATERSHED W-5 (44.02)						
YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR
1939 P							1.72	2.48	0.08	0.42	0	0.44	5.14
Q							.04	.06	0	0	0	0	.10
1940 P	0.43	0.55	0.72	1.41	1.87	1.62	.32	1.13	1.41	1.15	1.87	.69	13.17
Q	0	0	0	0	0	.02	0	0	0	0	0	0	.02
1941 P	.61	.60	.36	3.83	2.21	8.88	1.29	2.85	2.41	2.18	.88	1.28	27.38
Q	T	0	.10	.17	.07	1.71	0	T	0	T	T	0	2.05
1942 P	.05	.65	1.77	3.58	2.95	8.32	2.55	4.39	6.58	.40	.28	1.24	32.76
Q	T	0	.01	.02	.01	2.25	.32	.62	.93	0	0	0	4.16
1943 P	0	.76	.20	2.81	1.51	5.83	2.24	1.30	.09	1.25	.10	.15	16.24
Q	T	.35	0	.28	T	2.03	.03	0	0	.02	0	0	2.71
1944 P	.93	.22	1.78	5.47	5.99	3.21	1.86	7.82	1.12	.96	1.74	.16	31.26
Q	0	0	.01	.20	1.91	.30	0	1.31	.05	T	T	T	3.78
1945 P	.46	.70	.52	3.27	3.86	3.48	3.42	1.57	3.14	.32	.03	1.29	22.06
Q	T	T	T	.04	.15	.41	.41	T	.03	0	0	T	1.04
1946 P	.54	T	1.86	.20	2.68	2.63	3.89	3.84	5.07	3.93	2.14	.02	26.80
Q	.10	0	0	0	T	.04	.17	.36	.63	.30	.26	0	1.86
1947 P	.40	.26	.63	3.90	3.07	5.88	1.47	1.30	.36	.53	1.38	1.40	20.58
Q	0	0	0	.38	.12	1.31	.06	0	0	0	0	0	1.87
1948 P	.09	1.21	.57	.52	1.80	3.84	4.99	.97	1.17	.70	1.22	.46	17.54
Q	0	0	.10	0	0	.11	.89	0	.01	0	T	0	1.11
1949 P	1.05	.64	1.92	2.21	5.69	6.89	3.26	1.09	1.79	2.95	0	.17	27.66
Q	0	0	.03	.01	1.60	1.99	.14	0	T	.30	0	0	4.07
1950 P	.03	.55	.27	.68	4.56	2.09	5.89	2.10	4.68	1.36	.56	0	22.77
Q	0	0	0	0	.26	.15	1.27	T	1.67	.22	0	0	3.57
1951 P	.42	1.69	1.19	3.07	3.67	10.50	6.13	3.35	3.53	1.83	.50	.13	36.01
Q	0	.11	T	.01	.28	3.81	2.55	.06	.28	.03	0	0	7.13
1952 P	.21	.62	1.65	2.75	2.73	4.66	6.07	1.58	.44	0	.92	1.16	22.79
Q	T	0	.16	.07	.11	.76	1.79	.01	0	0	0	0	2.90
1953 P	.16	.93	1.06	2.10	3.02	3.19	1.32	1.87	1.39	.67	2.54	1.22	19.47
Q	0	0	0	T	.11	.80	0	T	0	0	.04	.03	.98
1954 P	.04	.27	.26	1.56	6.65	1.41	.87	3.85	1.63	1.90	.01	.46	18.91
Q	0	0	0	0	1.41	0	0	.01	.01	.02	0	0	1.45
1955 P	.36	.27	.22	.51	2.86	3.80	.62	.68	4.84	.18	0	.34	14.68
Q	0	0	0	0	.01	.13	0	0	.41	0	0	0	.55
1956 P	0.24	0.20	0.28	0.92	0.82	4.24	2.81	1.46	1.19	0.68	0.23	0.05	13.12
Q	0	0	0	T	0	.40	.18	.02	.01	.01	0	0	.62
1957 P	.17	.17	2.35	3.05	7.42	11.98	.20	5.27	.41	1.27	.60	.18	33.07
Q	0	0	.01	.11	1.13	5.28	0	.70	0	0	0	0	7.23
1958 P	.12	1.28	2.43	2.01	1.40	3.59	5.02	3.58	1.62	.20	.52	.04	21.81
Q	0	.01	.30	.13	0	.38	.25	.13	T	0	0	0	1.20
1959 P	.23	.31	3.68	.99	7.31	4.73	2.68	3.80	4.52	2.09	T	.09	30.43
Q	0	.02	.20	.01	1.27	.62	1.36	.46	.36	.07	0	0	4.37
1960 P	0.72	0.81	1.40	2.18	5.99	5.77	2.19	2.03	3.40	1.09	0.59	0.03	26.20
Q	0	T	1.63	.55	1.41	.94	T	T	.07	0	.01	0	4.61
1961 P	0.06	.25	2.72	1.38	7.24	4.80	2.70	3.64	3.82	.53	1.36	.67	29.17
Q	0	0	.01	.01	.51	.68	.01	.12	.06	0	.01	0	1.41
AVG P	.33	.59	1.27	2.19	3.88	5.06	2.81	2.70	2.48	1.19	.79	.51	23.80
	.00	.01	.12	.09	.47	1.10	.43	.17	.21	.04	.01	.00	2.62

Notes: Station records began July 1939, part year records for 1939 not included in station averages.

MONTHLY PRECIPITATION AND RUNOFF (INCHES)							WATERSHED W-8 (44.03)						
YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR
1939 P	0.29	0.23	0.67	2.42	1.80	3.82	1.46	2.10	0.02	0.42	0	0.21	13.44
Q	0	0	.12	.11	.01	.27	.01	T	0	0	0	0	.52
1940 P	.41	.55	.52	1.18	2.06	1.46	.30	1.16	1.38	1.09	1.58	.49	12.18
Q	0	0	0	0	0	.04	0	0	0	0	0	0	.04
1941 P	.42	.44	.25	3.48	1.98	8.19	1.39	2.80	2.48	2.45	.87	.77	25.52
Q	0	0	.05	.05	.02	1.69	0	0	0	.03	.02	0	1.86
1942 P	.08	.56	1.80	3.63	2.77	8.57	2.06	4.44	6.08	.38	.14	1.13	31.64
Q	.02	0	.03	T	.02	2.74	.01	.64	1.07	0	0	0	4.53
1943 P	0	.73	.15	2.55	1.55	6.02	2.18	1.34	.07	.80	.10	.13	15.62
Q	.02	.38	T	.13	T	1.66	.02	0	0	T	0	0	2.21
1944 P	.87	.22	.99	4.50	5.65	3.44	1.71	7.56	.94	.85	1.61	.07	28.41
Q	0	0	T	.20	1.25	.46	T	1.65	.12	.01	T	T	3.69
1945 P	.37	.51	.66	2.98	3.65	3.39	3.74	1.32	2.68	.32	.03	.99	20.64
Q	0	T	0	.01	.28	.76	.63	0	T	0	0	T	1.68
1946 P	.53	T	1.68	.20	2.82	2.89	3.87	3.87	5.48	4.01	1.98	.01	27.34
Q	.08	0	0	0	0	.04	.16	.30	.93	.43	.33	0	2.27
1947 P	.41	.14	.56	3.65	2.77	5.45	1.73	1.29	.32	.44	1.28	1.09	19.13
Q	0	0	0	.28	.04	.91	.08	0	0	0	0	0	1.31
1948 P	.10	1.06	.47	.51	1.65	3.78	4.55	1.06	1.06	.72	1.18	.37	16.51
Q	0	0	.13	0	0	.14	.50	0	0	0	0	0	.77
1949 P	.88	.50	1.68	1.96	5.60	7.01	3.50	1.01	1.72	3.07	0	.16	27.09
Q	0	0	.02	0	1.04	1.71	.43	0	0	.60	0	0	3.80
1950 P	.01	.50	.38	.63	4.19	1.89	5.34	2.13	4.74	1.33	.53	0	21.67
Q	0	0	0	0	.16	.16	1.01	0	1.42	.50	0	0	3.25
1951 P	.37	1.61	1.15	3.01	3.40	9.96	6.24	3.38	3.44	1.81	.51	.11	34.99
Q	0	.08	.01	.05	.21	3.44	2.85	.10	.61	.03	0	0	7.38
1952 P	.24	.54	1.64	2.68	2.86	4.64	5.78	1.24	.44	0	.82	.89	21.77
Q	T	0	.56	.12	.30	1.30	1.83	0	0	0	0	0	4.11
1953 P	.11	.75	.99	1.84	2.97	3.17	1.20	1.67	1.44	.74	2.56	1.19	18.63
Q	0	0	0	0	.42	.86	T	0	0	0	.02	.06	1.36
1954 P	.04	.28	.27	1.59	6.41	1.28	.91	3.82	1.54	1.78	.01	.47	18.40
Q	0	0	0	0	1.73	0	0	.01	T	.02	0	0	1.76
1955 P	.36	.41	.21	.79	2.46	3.71	.79	.64	4.99	.16	0	.29	14.81
Q	0	0	0	0	.01	.26	0	0	.68	0	0	0	.95
1956 P	0.23	0.16	0.26	1.06	0.73	3.89	2.81	1.54	1.18	0.71	0.09	0.04	12.70
Q	0	.05	0	0	0	.58	.29	.10	.01	T	0	0	1.03
1957 P	.15	.05	1.82	2.99	6.94	11.70	.20	5.45	.47	1.31	.58	.21	31.87
Q	0	0	T	.29	1.82	5.55	0	1.41	0	0	0	0	9.07
1958 P	.10	1.37	2.51	1.86	1.41	3.27	4.71	3.68	1.71	.07	.48	.05	21.22
Q	0	T	.24	.07	0	.44	.34	.36	.01	0	0	0	1.46
1959 P	.30	.34	3.70	.91	6.26	4.80	2.96	3.43	4.60	2.00	T	.07	29.37
Q	0	.08	.13	.03	.75	.82	1.28	.07	.63	.08	0	0	3.87
1960 P	0.76	0.78	1.45	2.11	5.78	5.44	2.14	1.68	3.14	1.03	0.43	0.02	24.76
Q	0	T	1.64	.72	1.47	1.10	.01	T	.11	0	0	0	5.05
1961 P	.06	.22	2.34	1.43	7.07	4.26	2.68	3.47	3.70	.50	1.14	.60	27.47
Q	0	0	.01	T	1.05	.53	.01	.30	.10	0	0	0	2.00
1962 P	.37	.68	2.03	.42	2.85	4.74	5.40	4.85	2.82	2.05	.13	.40	26.74
Q	.29	.01	.28	.00	T	.23	.57	.79	.14	.21	.00	.00	2.52
1963 P	.41	.00	1.50	1.50	.70	4.29	2.11	2.37	9.00	1.25	.29	.15	23.12
Q	.01	.19	.06	.00	.01	.25	.01	.00	1.74	.05	.00	.00	2.32
1964 P	T	.46	1.27	1.18	.89	5.99	3.53	5.41	1.63	.10	.52	T	20.98
Q	.00	.00	.00	.00	.00	1.37	.21	.71	.05	.00	.00	.00	2.34
1965 P	1.05	1.06	1.90	2.01	9.86	8.04	4.46	1.58	4.33	.46	.15	.54	35.44
Q	T	.15	.34	.02	3.56	2.64	.43	.00	.11	.00	.00	.00	7.25
1966 P	.08	1.16	.32	.78	.63	2.94	3.82	1.82	1.43	.82	T	.28	14.08
Q	.00	.08	.00	.00	.00	.03	.30	.01	T	.00	.00	.00	.42
1967 P	.13	.14	.26	1.68	4.89	6.26	2.89	.41	4.51	1.34	.12	.44	23.07
Q	.00	.00	.00	.00	.08	1.04	.36	.00	.15	.06	.00	.00	1.69
AVG P	.31	.53	1.15	1.91	3.53	4.98	2.92	2.64	2.68	1.10	.59	.38	22.72
Q	.02	.03	.13	.07	.49	1.07	.39	.22	.27	.07	.01	.00	2.77

Notes: Station records began Jan. 1939. Precipitation amounts are averages of amounts from individual gages for the years shown as follows: 1939 through 1961 gages are not documented; 1962A-31-R, B-32-R, C-31-R, D-31-R; 1963 through 1967 C-31-R, D-31-R, A-12-R, B-31-R.

MONTHLY PRECIPITATION AND RUNOFF (INCHES)													WATERSHED W-11 (44.04)	
YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR	
1939 P	0.27	0.28	0.77	2.58	1.84	3.57	1.53	2.05	0.02	0.43	0	0.28	13.62	
Q	0	0	0	0	.02	.12	.01	T	0	0	0	0	.15	
1940 P	.49	.70	.56	1.31	2.00	1.57	.32	1.04	1.34	1.04	1.69	.51	12.57	
Q	0	0	T	0	T	.02	0	0	0	0	0	0	.02	
1941 P	.44	.49	.25	3.50	2.02	8.31	1.46	2.72	2.54	2.24	.88	.90	25.75	
Q	0	0	.08	.04	.04	1.41	.01	.02	T	.01	.01	T	1.62	
1942 P	.09	.59	1.76	3.64	2.88	8.39	1.95	4.19	5.68	.41	.17	1.16	30.91	
Q	.01	0	.01	.05	.03	2.31	T	.44	.81	0	0	0	3.66	
1943 P	0	.75	.17	2.66	1.46	5.95	2.03	1.30	.07	.99	.11	.13	15.62	
Q	.03	.25	T	.13	T	1.58	T	0	0	T	0	0	1.99	
1944 P	.89	.27	1.08	4.47	5.38	3.17	1.91	8.14	1.00	.97	1.65	.08	29.01	
Q	T	T	T	.19	1.20	.26	.02	1.74	.08	.01	T	T	3.50	
1945 P	.37	.58	.72	2.95	3.70	3.35	3.82	1.31	2.64	.31	.03	1.02	20.80	
Q	T	T	T	T	.24	.60	.67	0	T	0	0	T	1.51	
1946 P	.53	T	1.75	.19	2.94	2.94	3.99	3.47	5.34	3.82	2.00	.01	26.98	
Q	.07	0	0	0	T	.05	.19	.20	.83	.27	.22	0	1.83	
1947 P	.41	.15	.61	3.61	2.78	5.46	1.83	1.45	.30	.44	1.30	1.16	19.50	
Q	0	0	T	.33	.04	.75	.10	0	0	0	0	0	1.22	
1948 P	.10	1.06	.53	.54	1.66	3.93	4.38	1.07	1.10	.72	1.22	.43	16.74	
Q	0	0	.11	0	0	.16	.33	0	0	0	0	0	.60	
1949 P	.90	.54	1.74	1.93	5.34	7.21	3.01	.99	1.72	3.02	0	.16	26.56	
Q	0	0	.03	0	.84	1.60	.25	0	0	.54	0	0	3.26	
1950 P	.02	.56	.35	.64	4.34	1.69	5.69	2.08	4.53	1.33	.54	0	21.77	
Q	0	0	0	0	.21	.09	1.10	0	1.37	.45	0	0	3.22	
1951 P	.37	1.63	1.14	2.97	3.37	10.27	6.64	3.29	3.50	1.82	.53	.11	35.64	
Q	0	.07	0	.06	.26	3.04	2.63	.09	.46	.03	0	0	6.64	
1952 P	.23	.55	1.68	2.82	2.86	4.60	5.76	1.42	.42	0	.87	.97	22.18	
Q	0	0	.49	.14	.34	1.18	1.59	0	0	0	0	0	3.74	
1953 P	.11	.73	1.01	1.77	2.85	3.28	1.13	1.62	1.42	1.10	2.55	1.17	18.74	
Q	0	0	0	0	.36	.85	0	0	0	.13	.04	.05	1.43	
1954 P	.04	.30	.27	1.51	6.35	1.37	.93	3.70	1.56	1.77	.01	.46	18.27	
Q	0	0	0	0	1.55	0	T	.02	.02	.02	0	0	1.61	
1955 P	.39	.44	.21	.69	2.37	3.60	.85	.62	5.18	.16	0	.28	14.79	
Q	0	0	0	0	.01	.18	0	0	.90	0	0	0	1.09	
1956 P	0.24	0.20	0.25	0.94	0.85	3.61	2.90	1.60	1.18	0.68	0.09	0.05	12.59	
Q	0	T	T	0	0	.39	.26	.10	.01	0	0	0	.76	
1957 P	.16	.06	1.92	3.03	6.38	11.77	.28	5.46	.46	1.25	.59	.22	31.58	
Q	0	0	T	.19	1.39	5.22	0	1.19	0	0	0	0	7.99	
1958 P	.12	1.30	2.59	1.82	1.46	3.37	4.80	3.74	1.80	.13	.50	.05	21.68	
Q	T	.25	.09	0	.26	.33	.38	.07	0	0	0	0	1.38	
1959 P	.30	.34	3.65	.89	6.49	4.92	2.98	3.61	4.61	2.01	0	.07	29.87	
Q	0	.01	.13	.03	.80	.86	1.26	.23	.59	.09	0	0	4.00	
1960 P	0.76	0.84	1.40	2.11	5.70	5.15	2.01	1.79	3.06	1.04	0.48	0.02	24.36	
Q	0	T	1.43	.68	1.73	.94	.01	T	.09	0	T	0	4.88	
1961 P	.06	.23	2.33	1.40	7.09	4.78	2.70	3.40	3.83	.51	1.19	.66	28.18	
Q	0	0	T	T	.86	.95	.01	.24	.15	T	T	0	2.21	
1962 P	.37	.68	2.10	.42	2.95	4.79	5.47	5.10	3.40	2.19	.15	.39	28.02	
Q	.21	.00	.52	.00	T	.21	.48	.81	.41	.25	.00	.00	2.89	
1963 P	.44	.00	1.70	1.20	.87	4.28	2.20	2.23	8.93	1.11	.29	.15	23.40	
Q	.01	.04	.08	T	T	.15	T	.00	1.08	.02	.00	.00	1.38	
1964 P	T	.43	1.19	1.16	.98	5.76	3.40	5.60	1.68	.11	.52	T	20.83	
Q	.00	.00	.00	.00	.00	.93	.11	.52	.08	.00	.00	.00	1.64	
1965 P	1.00	.92	1.96	2.09	9.38	8.16	4.32	1.62	4.27	.47	.15	.57	34.91	
Q	.00	.15	.27	.01	3.33	2.29	.36	.00	.12	.00	.00	.00	6.53	
1966 P	.07	1.14	.28	.77	.52	2.83	3.86	1.73	1.43	.78	T	.31	13.72	
Q	.00	.07	.00	.00	.00	.02	.24	T	.00	.00	.00	.00	.33	
1967 P	.09	.13	.29	1.60	4.81	6.13	2.75	.39	4.47	1.18	.14	.45	22.43	
Q	.00	.00	.00	.00	.06	.96	.26	.00	.15	.04	.00	.00	1.47	
AVG P	.32	.55	1.18	1.91	3.50	4.97	2.91	2.65	2.67	1.11	.61	.40	22.78	
Q	.01	.03	.12	.06	.46	.95	.35	.21	.25	.06	.01	T	2.51	

Notes: Station records began Jan. 1939. Precipitation amounts are averages of amounts from individual gages for the years shown as follows: 1939 through 1962 are not documented; 1962 A-31-R, B-32-R; 1962 through 1967 C-31-R, A-12-R, D-31-R, E-30-R, G-42-R, B-31-R.

MONTHLY PRECIPITATION AND RUNOFF (INCHES)													WATERSHED 1-H (44.05)	
YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR	
1939 P			0.91	2.37	1.86	4.57	1.34	2.39	0.04	0.39	0	0.21	14.08	
Q			0	0	T	.02	0	.05	0	0	0	0	.07	
1940 P	0.22	0.51	.58	1.07	2.59	1.34	.33	1.48	1.37	1.01	1.40	.42	12.32	
Q	0	0	0	0	T	T	0	0	0	0	0	0	T	
1941 P	.39	.41	.22	3.56	2.01	8.46	1.39	2.79	2.51	2.62	.87	.59	25.82	
Q	.04	0	.22	0	0	.01	0	0	0	0	0	0	.27	
1942 P	.03	.53	1.74	3.55	2.67	8.35	2.10	4.62	6.58	.36	.10	1.02	31.65	
Q	0	0	T	0	0	T	T	T	T	0	0	0	T	
1943 P	0	.74	.12	2.43	1.69	6.04	2.32	1.43	.04	.74	.10	.17	15.82	
Q	0	.01	T	T	0	.02	0	0	0	0	0	0	.03	
1944 P	.89	.18	1.22	4.65	5.61	3.50	1.67	7.69	.78	.79	1.51	.06	28.55	
Q	0	T	.01	.01	T	T	0	T	0	0	0	0	.02	
1945 P	.25	.38	.49	2.97	3.63	3.43	3.80	1.35	2.47	.32	.02	1.02	20.13	
Q	0	0	0	.01	0	.01	.01	0	T	0	0	0	.03	
1946 P	.66	.01	1.64	.22	2.84	2.64	3.31	3.79	5.64	4.24	1.99	.01	26.99	
Q	.03	0	0	0	0	0	0	.02	.01	0	0	0	.06	
1947 P	.50	.19	.65	3.71	2.64	5.99	1.49	1.11	.35	.41	1.29	1.16	19.49	
Q	0	0	0	T	0	T	0	0	0	0	0	0	T	
1948 P	.09	1.12	.45	.53	1.70	4.06	4.34	.87	.97	.76	1.21	.41	16.51	
Q	0	0	0	0	0	0	T	0	0	0	0	0	T	
1949 P	.95	.51	1.58	2.09	5.56	6.28	3.24	1.05	1.76	3.03	0	.17	26.22	
Q	0	0	0	0	.02	.02	.04	0	0	.13	0	0	.21	
1950 P	.02	.53	.27	.62	3.78	2.01	5.42	2.22	4.79	1.30	.52	0	21.48	
Q	0	0	0	0	T	T	T	0	.08	T	0	0	.08	
1951 P	.38	1.60	1.07	3.15	3.56	10.09	5.83	3.43	3.33	1.70	.52	.12	34.78	
Q	0	T	0	0	0	1.04	.70	0	0	0	0	0	1.74	
1952 P	.21	.52	1.71	2.37	2.96	4.76	5.67	1.34	.42	0	.74	.84	21.54	
Q	0	0	0	.01	.01	.10	.15	0	0	0	0	0	.27	
1953 P	.10	.78	1.13	2.12	2.98	3.18	1.34	1.56	1.30	.66	2.40	1.16	18.71	
Q	0	0	0	0	0	T	0	0	0	0	0	0	T	
1954 P	.04	.29	.21	1.59	6.03	1.18	.93	3.94	1.53	1.84	.01	.45	18.04	
Q	0	0	0	0	.14	0	0	0	0	0	0	0	.14	
1955 P	.36	.21	.17	.61	2.95	3.79	.74	.50	4.67	.17	0	.24	14.41	
Q	0	0	0	0	0	0	0	0	.08	0	0	0	.08	
1956 P	0.18	0.08	0.30	1.10	0.56	4.22	2.68	1.59	1.24	0.81	0.10	0.05	12.91	
Q	0	T	0	0	0	0	0	0	0	0	0	0	T	
1957 P	.13	.08	1.85	3.01	6.93	11.33	.19	5.46	.44	1.31	.58	.12	31.43	
Q	0	0	0	0	T	1.13	0	.04	0	0	0	0	1.17	
1958 P	.07	1.24	1.97	1.73	1.50	2.88	4.74	3.51	1.49	.08	.45	.03	19.69	
Q	0	T	0	0	0	.14	0	0	0	0	0	0	.14	
1959 P	.21	.25	3.29	.88	6.26	4.89	3.12	3.32	4.80	1.87	T	.06	28.95	
Q	0	T	.02	0	T	0	.42	.01	T	0	0	0	.45	
1960 P	0.73	0.74	1.30	2.06	5.92	5.59	2.46	1.44	3.04	0.98	0.43	0.02	24.71	
Q	0	.01	.39	0	.38	.01	0	0	.02	0	0	0	.81	
1961 P	.08	.15	1.96	1.39	6.86	4.19	2.44	3.48	3.54	.50	1.01	.49	26.09	
Q	0	0	0	0	T	T	T	.10	T	0	0	0	.10	
1962 P	.38	.61	1.80	.46	2.97	4.47	5.65	4.88	2.83	1.95	.17	.40	26.57	
Q	.10	.00	.14	.00	.00	.00	T	.02	.00	T	.00	.00	.26	
1963 P	.32	.00	1.52	1.07	.51	4.25	2.16	2.21	8.27	1.46	.30	.13	22.20	
Q	.00	T	.22	.00	.00	.00	.00	.00	.00	.00	.00	.00	.22	
1964 P	T	.47	1.38	1.20	.99	6.09	4.40	5.88	1.66	.10	.52	T	22.69	
Q	.00	.00	.00	.00	.00	.57	.54	.64	.00	.00	.00	.00	1.75	
1965 P	1.01	1.37	1.57	2.01	11.07	7.45	4.48	1.63	3.99	.46	.14	.57	35.75	
Q	.00	.25	.07	.00	4.27	.44	.04	.00	.00	.00	.00	.00	5.07	
1966 P	.05	1.17	.43	.59	.66	3.03	3.97	1.67	1.13	.78	T	.22	13.70	
Q	.00	T	.00	.00	.00	.00	.27	.00	.00	.00	.00	.00	.27	
1967 P	.12	.15	.13	1.62	4.77	6.39	3.12	.33	4.37	1.17	.10	.50	22.77	
Q	T	.00	.00	.00	.00	.81	.34	.00	.00	.00	.00	.00	1.15	
AVG P	.30	.52	1.09	1.87	3.64	4.99	2.97	2.66	2.69	1.13	.58	.37	22.81	
Q	.01	.01	.04	.00	.17	.15	.09	.05	.01	.01	.00	.00	.54	

Notes: Station records began March 1939, part year records for 1939 not included in station averages. Precipitation amounts are averages of amounts from individual gages for the years shown as follows: 1939 through 1961 gages are not documented; 1962 through 1967 B-36-R.

MONTHLY PRECIPITATION AND RUNOFF (INCHES)							WATERSHED 2-H (44.06)						
YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR
1939 P			0.91	2.37	1.79	4.40	1.22	2.57	0.04	0.37	0	0.24	13.91
Q			0	0	0	0	0	.16	0	0	0	0	.16
1940 P	0.25	0.28	.61	1.15	2.23	1.43	.32	1.36	1.42	1.04	1.63	.47	12.19
Q	0	0	0	0	T	T	0	0	0	0	0	0	T
1941 P	.41	.40	.17	3.50	2.20	8.62	1.49	2.86	2.42	2.56	.88	.76	26.27
Q	.04	0	.21	T	0	.40	0	0	0	0	0	0	.65
1942 P	.08	.52	1.82	3.52	2.77	8.44	2.27	4.55	6.70	.37	.15	.99	32.18
Q	.11	0	.03	0	0	.44	T	.22	.26	0	0	0	1.06
1943 P	0	.77	.19	2.44	1.61	6.03	2.31	1.39	.02	.86	.12	.14	15.88
Q	0	.23	0	0	0	.04	0	0	0	0	0	0	.27
1944 P	.84	.15	1.10	4.27	5.73	3.51	1.73	7.71	.92	.87	1.54	.05	28.42
Q	0	0	0	0	.10	.03	0	.22	0	0	0	0	.35
1945 P	.34	.48	.60	2.97	3.52	3.26	3.63	1.39	2.39	.31	.02	1.11	20.02
Q	T	0	0	T	0	.03	.11	0	0	0	0	0	.14
1946 P	.47	T	1.54	.21	2.88	2.54	3.32	3.91	5.42	4.18	1.85	T	26.32
Q	.03	0	0	0	0	0	0	.19	.24	.02	0	0	.48
1947 P	.55	.11	.51	3.54	2.62	5.75	1.46	1.08	.33	.43	1.27	1.08	18.73
Q	0	0	0	.04	T	.02	T	0	0	0	0	0	.06
1948 P	.10	.98	.56	.49	1.71	3.97	4.51	.88	.96	.82	1.16	.51	16.65
Q	0	0	0	0	0	0	.18	T	0	0	0	0	.18
1949 P	.95	.49	1.54	2.13	5.54	6.34	3.53	1.05	1.83	3.12	0	.17	26.69
Q	0	0	0	0	.17	.26	.06	0	0	.09	0	0	.58
1950 P	T	.39	.23	.61	3.99	2.08	5.28	2.21	4.58	1.29	.54	0	21.20
Q	0	0	0	0	0	.01	T	0	.05	0	0	0	.06
1951 P	.34	1.61	1.08	3.13	3.51	10.16	5.70	3.42	3.21	1.81	.50	.10	34.57
Q	0	.01	0	0	0	1.06	.76	T	0	0	0	0	1.83
1952 P	.23	.50	1.58	2.27	2.75	5.25	5.89	1.46	.47	0	.82	.88	22.10
Q	0	0	0	0	.06	.23	.58	0	0	0	0	0	.87
1953 P	.14	1.04	1.19	2.07	2.75	3.48	1.30	1.79	1.32	.69	2.39	1.06	19.22
Q	0	0	0	0	0	.05	0	0	0	0	0	0	.05
1954 P	.04	.29	.25	1.52	6.55	1.33	.91	4.07	1.42	1.80	.01	.45	18.64
Q	0	0	0	0	.46	0	0	0	0	0	0	0	.46
1958 P	0.07	1.24	1.97	1.73	1.50	2.88	4.74	3.51	1.49	0.08	0.45	0.03	19.69
Q	0	0	0	0	0	.18	0	0	0	0	0	0	.18
1959 P	.21	.25	3.29	.88	6.26	4.89	3.12	3.32	4.80	1.87	T	.06	28.95
Q	0	T	0	T	.09	.09	1.41	.03	.06	0	0	0	1.68
1960 P	0.73	0.74	1.30	2.06	5.92	5.59	2.46	1.44	3.04	0.98	0.43	0.02	24.71
Q	0	.01	.89	.16	.79	.04	0	0	.01	0	0	0	1.90
1961 P	.08	.15	1.96	1.39	6.86	4.19	2.44	3.48	3.54	.50	1.01	.49	26.09
Q	0	0	0	0	.10	.06	T	T	.16	0	.01	0	.33
1962 P	.38	.61	1.80	.46	2.97	4.47	5.65	4.88	2.83	1.95	.17	.40	26.57
Q	.15	.00	.36	.00	.00	T	.03	.43	.00	T	.00	.00	.97
1963 P	.32	.00	1.52	1.07	.51	4.25	2.16	2.21	8.27	1.46	.30	.13	22.20
Q	.00	T	.25	.00	.00	.00	.00	.00	.05	.00	.00	.00	.30
1964 P	T	.47	1.38	1.20	.99	6.09	4.40	5.88	1.66	.10	.52	T	22.69
Q	.00	.00	.00	.00	.00	.11	.07	.07	T	.00	.00	.00	.25
1965 P	1.01	1.37	1.57	2.01	11.07	7.45	4.48	1.63	3.99	.46	.14	.57	35.75
Q	.00	.00	.02	.00	5.49	1.64	.11	.00	.00	.00	.00	.00	7.26
1966 P	.05	1.17	.43	.68	.65	3.11	4.02	1.70	1.12	.78	T	.22	13.93
Q	.00	.10	.00	.00	.00	.02	.03	.00	.00	.00	.00	.00	.15
1967 P	.12	.15	.13	1.61	4.74	6.42	3.16	.35	4.37	1.22	.10	.50	22.87
Q	.00	.00	.00	.00	.00	.21	.33	.00	T	.00	.00	.00	.54
AVG P	.31	.57	1.13	1.87	3.68	4.86	3.21	2.70	2.74	1.18	.64	.41	23.30
Q	.03	.03	.22	.19	.91	1.38	.72	.37	.45	.21	.04	.00	4.55

Notes: Station records began March 1939, part year records for 1939 and period of no records, 1955 through 1957, not included in station averages. Precipitation amounts are averages of amounts from individual gages for the years shown as follows: 1939 through 1954, 1958 through 1964 are not documented; 1965 B-36-R; 1966 and 1967 B-34-R.

MONTHLY PRECIPITATION AND RUNOFF (INCHES)

WATERSHED 3-H (44.07)

YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR
1939 P			0.91	2.37	1.79	4.40	1.22	2.57	0.04	0.37	0	0.24	13.91
Q			.03	.16	.02	1.07	0	.78	0	0	0	0	2.06
1940 P	0.25	0.28	.61	1.15	2.23	1.43	.32	1.36	1.42	1.04	1.63	.47	12.19
Q	0	.03	.51	0	.04	.04	0	0	0	0	0	0	.62
1941 P	.41	.40	.17	3.50	2.20	8.62	1.49	2.86	2.42	2.56	.88	.76	26.27
Q	.01	.01	.06	.24	T	3.57	0	.32	.07	.62	.04	0	4.94
1942 P	.08	.52	1.82	3.52	2.77	8.44	2.27	4.55	6.70	.37	.15	.99	32.18
Q	.41	0	.23	.13	.05	3.10	.23	.88	.55	0	0	0	5.58
1943 P	0	.77	.19	2.44	1.61	6.03	2.31	1.39	.02	.86	.12	.14	15.88
Q	0	.05	.04	.38	.09	2.42	.21	T	0	0	0	0	3.19
1944 P	.84	.15	1.10	4.27	5.73	3.51	1.73	7.71	.92	.87	1.54	.05	28.42
Q	0	.01	.12	.97	2.02	.80	0	2.90	.11	.06	.11	0	7.10
1945 P	.34	.48	.60	2.97	3.52	3.26	3.63	1.39	2.39	.31	.02	1.11	20.02
Q	0	0	0	.49	.84	1.29	.68	.01	T	0	0	0	3.31
1946 P	.47	T	1.54	.21	2.88	2.54	3.32	3.91	5.42	4.18	1.85	T	26.32
Q	.03	0	.02	0	.01	.20	.34	.91	1.86	1.35	.68	0	5.40
1947 P	.55	.11	.51	3.54	2.62	5.75	1.46	1.08	.33	.43	1.27	1.08	18.73
Q	0	0	0	.50	.17	2.61	.09	0	0	0	0	0	3.37
1948 P	.10	.98	.56	.49	1.71	3.97	4.51	.88	.96	.82	1.16	.51	16.65
Q	0	0	.40	0	0	.27	1.44	0	0	0	0	0	2.11
1949 P	.95	.49	1.54	2.13	5.54	6.34	3.53	1.05	1.83	3.12	0	.17	26.69
Q	0	0	.07	.19	3.27	2.80	.94	0	.05	1.36	0	0	8.68
1950 P	T	.39	.23	.61	3.99	2.08	5.28	2.21	4.58	1.29	.54	0	21.20
Q	0	0	0	0	.05	.50	2.13	.21	2.66	.71	0	0	6.26
1951 P	.34	1.61	1.08	3.13	3.51	10.16	5.70	3.42	3.21	1.81	.50	.10	34.57
Q	0	.39	.10	.28	.81	6.38	3.80	.04	.04	0	0	0	11.84
1952 P	.23	.50	1.58	2.27	2.75	5.25	5.89	1.46	.47	0	.82	.88	22.10
Q	0	0	0	.06	.78	1.72	3.15	0	0	0	0	0	5.71
1953 P	.14	1.04	1.19	2.07	2.75	3.48	1.30	1.79	1.32	.69	2.39	1.06	19.22
Q	0	0	0	.01	.98	1.47	0	.09	.03	0	0	0	2.58
1954 P	.04	.29	.25	1.52	6.55	1.33	.91	4.07	1.42	1.80	.01	.45	18.64
Q	0	0	0	.10	2.93	0	0	.05	.05	.22	0	0	3.35
1958 P	0.07	1.24	1.97	1.73	1.50	2.88	4.74	3.51	1.49	0.08	0.45	0.03	19.69
Q	0	.03	0	.11	0	.06	.83	.61	T	0	0	0	1.64
1959 P	.21	.25	3.29	.88	6.26	4.89	3.12	3.32	4.80	1.87	T	.06	28.95
Q	0	.01	.06	T	.83	1.72	2.35	.22	1.27	.32	0	0	6.78
1960 P	0.73	0.74	1.30	2.06	5.92	5.59	2.46	1.44	3.04	0.98	0.43	0.02	24.71
Q	0	.03	3.13	.94	3.01	1.31	.05	0	.87	.04	.06	0	9.44
1961 P	.08	.15	1.96	1.39	6.86	4.19	2.44	3.48	3.54	.50	1.01	.49	26.09
Q	0	0	.10	.05	1.58	.74	T	.71	.26	0	.05	0	3.49
1962 P	.38	.61	1.80	.46	2.97	4.47	5.65	4.88	2.83	1.95	.17	.40	26.57
Q	.15	.00	.53	.00	.01	.20	.92	1.21	.24	.24	.00	.00	3.50
1963 P	.32	.00	1.52	1.07	.51	4.25	2.16	2.21	8.27	1.46	2.30	.13	22.20
Q	.00	T	.06	.00	.00	.22	.01	.00	3.13	.33	.00	.00	3.75
1964 P	T	.47	1.38	1.20	.99	6.09	4.40	5.88	1.66	.10	.52	.00	22.69
Q	.00	.02	.00	.00	.00	1.15	.53	1.09	.01	.00	.00	.00	2.80
1965 P	1.01	1.37	1.57	2.01	11.07	7.45	4.48	1.63	3.99	.46	.14	.57	35.75
Q	.00	.50	.64	.05	5.96	1.99	.40	.00	.10	.00	.00	.00	9.64
1966 P	.05	1.17	.43	.77	.64	3.19	4.07	1.74	1.11	.78	T	.22	14.17
Q	.00	.15	T	T	.00	.11	.75	.00	.00	.00	.00	.00	1.01
1967 P	.12	.15	.13	1.60	4.72	6.45	3.19	.37	4.37	1.27	.10	.50	22.97
Q	.04	.10	.00	.00	.05	1.31	.62	.00	.01	.00	.00	.00	2.13
AVG P	.31	.57	1.13	1.87	3.68	4.86	3.22	2.70	2.74	1.19	.64	.41	23.32
Q	.03	.06	.25	.20	.94	1.44	.77	.37	.45	.21	.04	.00	4.76

Notes: Station records began March 1939, part year records for 1939 and period of no records, 1955 through 1957, not included in station averages. Precipitation amounts are averages of amounts from individual gages for the years shown as follows: 1939 through 1954; 1958 through 1964 are not documented; 1965 B-36-R; 1966 and 1967 B-34-R.

MONTHLY PRECIPITATION AND RUNOFF (INCHES)

WATERSHED 4-H (44.08)

YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR
1939 P				2.37	1.86	4.57	1.34	2.39	0.04	0.39	0	0.21	13.17
Q				0	0	.70	.04	.30	0	0	0	0	1.04
1940 P	0.22	0.51	0.58	1.07	2.59	1.34	.33	1.48	1.37	1.01	1.40	.42	12.32
Q	0	.02	.26	0	.06	.33	0	0	.05	0	.04	0	.76
1941 P	.39	.41	.22	3.56	2.01	8.46	1.39	2.79	2.51	2.62	.87	.59	25.82
Q	.03	0	.15	.46	.35	1.85	0	T	0	.59	.06	0	3.49
1942 P	.03	.53	1.74	3.55	2.67	8.35	2.10	4.62	6.58	.36	.10	1.02	31.65
Q	.22	0	.07	.06	.05	2.62	.30	.87	1.06	0	0	0	5.25
1943 P	0	.74	.12	2.43	1.69	6.04	2.32	1.43	.04	.74	.10	.17	15.82
Q	0	.06	.03	.25	T	1.88	.05	0	0	0	0	0	2.27
1944 P	.89	.18	1.22	4.65	5.61	3.50	1.67	7.69	.78	.79	1.51	.06	28.55
Q	0	.01	.02	.89	2.50	.75	0	.84	0	0	0	0	5.01
1945 P	.25	.38	.49	2.97	3.63	3.43	3.80	1.35	2.47	.32	.02	1.02	20.13
Q	0	0	0	.10	.18	.65	.60	T	.01	0	0	T	1.54
1946 P	.66	.01	1.64	.22	2.84	2.64	3.31	3.79	5.64	4.24	1.99	.01	26.99
Q	T	0	0	0	0	.01	.17	.94	1.49	.74	.33	0	3.68
1947 P	.50	.19	.65	3.71	2.64	5.99	1.49	1.11	.35	.41	1.29	1.16	19.49
Q	0	0	0	.51	.07	1.68	.08	0	0	0	0	0	2.34
1948 P	.09	1.12	.45	.53	1.70	4.06	4.34	.87	.97	.76	1.21	.41	16.51
Q	0	0	.25	0	0	.27	1.02	0	0	0	0	0	1.54
1949 P	.95	.51	1.58	2.09	5.56	6.28	3.24	1.05	1.76	3.03	0	.17	26.22
Q	0	0	.08	.01	2.74	1.44	.61	0	.10	1.23	0	0	6.21
1950 P	.02	.53	.27	.62	3.78	2.01	5.42	2.22	4.79	1.30	.52	0	21.48
Q	0	0	0	0	.54	.24	1.56	0	2.44	.72	0	0	5.50
1951 P	.38	1.60	1.07	3.15	3.56	10.09	5.83	3.43	3.33	1.70	.52	.12	34.78
Q	0	.20	.10	.32	.81	5.92	2.79	.08	.12	0	0	0	10.34
1952 P	.21	.52	1.71	2.37	2.96	4.76	5.67	1.34	.42	0	.74	.84	21.54
Q	0	0	0	.04	.21	2.46	2.53	.01	0	0	0	0	5.25
1953 P	.10	.78	1.13	2.12	2.98	3.18	1.34	1.56	1.30	.66	2.40	1.16	18.71
Q	0	0	0	.02	.49	.77	0	0	0	0	0	0	1.28
1954 P	.04	.29	.21	1.59	6.03	1.18	.93	3.94	1.53	1.84	.01	.45	18.04
Q	0	0	0	.28	2.69	0	0	.30	T	.13	0	0	3.40
1958 P	0.07	1.24	1.97	1.73	1.50	2.88	4.74	3.51	1.49	0.08	0.45	0.03	19.69
Q	0	.01	0	.03	0	.09	.38	.03	0	0	0	0	.54
1959 P	.21	.25	3.29	.88	6.26	4.89	3.12	3.32	4.80	1.87	T	.06	28.95
Q	0	.01	.24	.03	2.01	1.03	2.15	.53	2.54	.73	0	0	9.27
1960 P	0.73	0.74	1.30	2.06	5.92	5.59	2.46	1.44	3.04	0.98	0.43	0.02	24.71
Q	0	.03	2.63	1.38	3.43	1.48	.08	0	.40	0	0	0	9.43
1961 P	.08	.15	1.96	1.39	6.86	4.19	2.44	3.48	3.54	.50	1.01	.49	26.09
Q	0	0	.01	.04	1.90	.88	T	.88	.45	0	.05	0	4.21
1962 P	.38	.61	1.80	.46	2.97	4.47	5.65	4.88	2.83	1.95	.17	.40	26.57
Q	.20	.00	.65	.00	.04	.37	2.04	1.67	.18	.21	.00	.00	5.36
1963 P	.32	.00	1.52	1.07	.51	4.25	2.16	2.21	8.27	1.46	.30	.13	22.20
Q	.00	T	.06	T	.00	.11	.03	T	1.48	.08	.00	.00	1.76
1964 P	T	.47	1.38	1.20	.99	5.98	4.25	5.81	1.65	.09	.52	.00	22.34
Q	.00	.00	.00	.00	.00	3.20	1.57	2.56	.12	.00	.00	.00	7.45
1965 P	1.01	1.37	1.57	2.08	10.98	7.45	4.46	1.60	4.00	.44	.14	.57	35.67
Q	.00	.24	1.00	.09	7.44	3.75	.47	.00	.22	.00	.00	.00	13.21
1966 P	.05	1.17	.43	.68	.65	3.11	4.02	1.70	1.12	.78	T	.22	13.93
Q	.00	.02	.00	.00	.00	.02	.31	.00	.00	.00	.00	.00	.35
1967 P	.12	.15	.13	1.61	4.74	6.42	3.16	.35	4.37	1.22	.10	.50	22.87
Q	.00	.00	.00	.00	.06	1.35	1.10	.00	.35	.23	.00	.00	3.09
AVG P	.31	.57	1.13	1.91	3.66	4.82	3.19	2.68	2.76	1.17	.63	.40	23.23
Q	.02	.02	.22	.18	1.02	1.32	.72	.35	.44	.19	.02	.00	4.50

Notes: Station records began April 1939, part year records for 1939 and period of no records, 1955 through 1957, not included in station averages. Precipitation amounts are averages of amounts from individual gages for the years shown as follows: 1939 through 1954; 1958 through 1964 are not documented; 1965 through 1967 B-34-R, B-36-R.

MONTHLY PRECIPITATION AND RUNOFF (INCHES)

WATERSHED 5-H (44.09)

YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR
1939 P				2.37	1.86	4.57	1.34	2.39	0.04	0.39	0	0.21	13.17
Q				0	0	.52	.01	.28	0	0	0	0	.81
1940 P	0.22	0.51	0.58	1.07	2.59	1.34	.33	1.48	1.37	1.01	1.40	.42	12.32
Q	0	.05	.09	0	.02	.01	0	0	T	0	0	0	.17
1941 P	.39	.41	.22	3.56	2.01	8.46	1.39	2.79	2.51	2.62	.87	.59	25.82
Q	0	0	.13	.18	0	1.74	0	.11	.04	.38	.12	T	2.70
1942 P	.03	.53	1.74	3.55	2.67	8.35	2.10	4.62	6.58	.36	.10	1.02	31.65
Q	.36	0	.18	.18	.13	2.41	.13	.79	.16	0	0	0	4.34
1943 P	0	.74	.12	2.43	1.69	6.04	2.32	1.43	.04	.74	.10	.17	15.82
Q	0	.02	.02	.28	.04	1.72	.05	T	0	0	0	0	2.13
1944 P	.89	.18	1.22	4.65	5.61	3.50	1.67	7.69	.78	.79	1.51	.06	28.55
Q	0	T	.01	.30	1.31	.50	0	1.80	.07	.02	.02	0	4.03
1945 P	.25	.38	.49	2.97	3.63	3.43	3.80	1.35	2.47	.32	.02	1.02	20.13
Q	0	0	0	.16	.67	1.13	.64	T	0	0	0	T	2.60
1946 P	.66	.01	1.64	.22	2.84	2.64	3.31	3.79	5.64	4.24	1.99	.01	26.99
Q	T	0	0	0	.01	.09	.19	.16	.87	.57	.29	0	2.18
1947 P	.50	.19	.65	3.71	2.64	5.99	1.49	1.11	.35	.41	1.29	1.16	19.49
Q	0	0	0	.48	.03	1.48	.08	0	0	0	0	0	2.07
1948 P	.09	1.12	.45	.53	1.70	4.06	4.34	.87	.97	.76	1.21	.41	16.51
Q	0	0	.50	0	0	.11	.65	0	0	0	0	0	1.26
1949 P	.95	.51	1.58	2.09	5.56	6.28	3.24	1.05	1.76	3.03	0	.17	26.22
Q	0	0	T	.03	2.06	2.25	.57	0	.01	.92	0	0	5.84
1950 P	.02	.53	.27	.62	3.78	2.01	5.42	2.22	4.79	1.30	.52	0	21.48
Q	0	0	0	0	.03	.06	1.39	.09	1.97	.44	0	0	3.98
1951 P	.38	1.60	1.07	3.15	3.56	10.09	5.83	3.43	3.33	1.70	.52	.12	34.78
Q	0	.14	.03	.12	.61	4.49	2.50	.03	.02	0	0	0	7.94
1952 P	.21	.52	1.71	2.37	2.96	4.76	5.67	1.34	.42	0	.74	.84	21.54
Q	0	0	0	.02	.63	.97	2.12	0	0	0	0	0	3.74
1953 P	.10	.78	1.13	2.12	2.98	3.18	1.34	1.56	1.30	.66	2.40	1.16	18.71
Q	0	0	0	.01	.25	.62	0	0	0	0	0	0	.88
1954 P	.04	.29	.21	1.59	6.03	1.18	.93	3.94	1.53	1.84	.01	.45	18.04
Q	0	0	0	T	2.28	0	0	.10	T	.09	0	0	2.47
1955 P	.36	.21	.17	.61	2.95	3.79	.74	.50	4.67	.17	0	.24	14.41
Q	0	0	0	0	.07	.61	0	0	.69	0	0	0	1.37
1956 P	0.18	0.08	0.30	1.10	0.56	4.22	2.68	1.59	1.24	0.81	0.10	0.05	12.91
Q	0	T	0	0	0	.67	.07	.05	.02	T	0	0	.81
1958 P	0.07	1.24	1.97	1.73	1.50	2.88	4.74	3.51	1.49	0.08	0.45	0.03	19.69
Q	0	.02	0	.13	.01	.23	.49	.18	.02	0	0	0	1.08
1959 P	.21	.25	3.29	.88	6.26	4.89	3.12	3.32	4.80	1.87	T	.06	28.95
Q	0	.07	.24	.02	1.46	.52	1.77	.27	.19	T	0	0	4.54
1960 P	0.73	0.74	1.30	2.06	5.92	5.59	2.46	1.44	3.04	0.98	0.43	0.02	24.71
Q	0	.03	2.33	.42	2.03	1.70	.09	.01	.22	0	0	0	6.83
1961 P	.08	.15	1.96	1.39	6.86	4.19	2.44	3.48	3.54	.50	1.01	.49	26.09
Q	0	0	.02	.03	1.24	1.01	T	.94	.19	0	.10	0	3.53
1962 P	.38	.61	1.80	.46	2.97	4.47	5.65	4.88	2.83	1.95	.17	.40	26.57
Q	.30	.00	.27	.00	.02	.29	.20	.41	.07	.06	.00	.00	1.62
1963 P	.32	.00	1.52	1.07	.51	4.25	2.16	2.21	8.27	1.46	.30	.13	22.20
Q	.00	T	.04	T	.00	.52	.06	.00	1.76	.11	.00	.00	2.49
1964 P	T	.47	1.38	1.20	.99	6.09	4.40	5.88	1.66	.10	.52	.00	22.69
Q	.00	.00	.00	.00	.00	.91	1.08	2.07	T	.00	.00	.00	4.06
1965 P	1.01	1.37	1.57	2.01	11.07	7.45	4.48	1.63	3.99	.46	.14	.57	35.75
Q	.00	.19	.18	.02	6.42	1.42	.49	.00	.09	.00	.00	.00	8.81
1966 P	.05	1.17	.43	.68	.65	3.11	4.02	1.70	1.12	.78	T	.22	13.93
Q	.00	.27	.00	.00	.00	.01	.23	T	.00	.00	.00	.00	.51
1967 P	.12	.15	.13	1.61	4.74	6.42	3.16	.35	4.37	1.22	.10	.50	22.87
Q	.00	.01	.00	.00	.07	.47	.37	.00	.66	.29	.00	.00	1.87
AVG P	.30	.54	1.07	1.83	3.53	4.76	3.08	2.56	2.78	1.12	.59	.38	22.54
Q	.03	.03	.15	.09	.72	1.02	.48	.28	.26	.11	.02	.00	3.19

Notes: Station records began April 1939, part year records for 1939 and period of no record, 1957, not included in station averages. Precipitation amounts are averages of amounts from individual gages for the years shown as follows: 1939 through 1956; 1958 through 1964 are not documented; 1965 through 1967 B-36-R.

MONTHLY PRECIPITATION AND RUNOFF (INCHES)

WATERSHED 6-H (44.10)

YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR
1939 P				2.32	1.86	4.57	1.34	2.39	0.04	0.39	0	0.21	13.12
Q				0	.04	.97	T	.01	0	0	0	0	1.02
1940 P	0.22	0.51	0.58	1.07	2.59	1.34	.33	1.48	1.37	1.01	1.40	.42	12.32
Q	0	T	.10	0	.25	.18	0	0	0	0	.01	0	.54
1941 P	.39	.41	.22	3.56	2.01	8.46	1.39	2.79	2.51	2.62	.87	.59	25.82
Q	T	0	.09	.18	.08	1.47	0	.05	T	.11	.02	0	2.00
1942 P	.03	.53	1.74	3.55	2.67	8.35	2.10	4.62	6.58	.36	.10	1.02	31.65
Q	.11	0	.05	.08	0	2.10	.06	1.10	1.85	0	0	0	5.35
1943 P	0	.74	.12	2.43	1.69	6.04	2.32	1.43	.04	.74	.10	.17	15.82
Q	.03	.25	0	.24	.04	1.64	.02	0	0	0	0	0	2.22
1944 P	.89	.18	1.22	4.65	5.61	3.50	1.67	7.69	.78	.79	1.51	.06	28.55
Q	0	0	.05	.62	2.17	.78	0	.57	.01	T	0	0	4.20
1945 P	.25	.38	.49	2.97	3.63	3.43	3.80	1.35	2.47	.32	.02	1.02	20.13
Q	0	0	0	.03	.05	.54	.78	T	.01	0	0	T	1.41
1946 P	.66	.01	1.64	.22	2.84	2.64	3.31	3.79	5.64	4.24	1.99	.01	26.99
Q	.02	0	0	0	0	.01	.03	.31	2.03	.95	.73	0	4.08
1947 P	.50	.19	.65	3.71	2.64	5.99	1.49	1.11	.35	.41	1.29	1.16	19.49
Q	0	0	0	.31	.19	1.50	.15	0	0	0	0	0	2.15
1948 P	.09	1.12	.45	.53	1.70	4.06	4.34	.87	.97	.76	1.21	.41	16.51
Q	0	0	.80	0	T	.33	.90	0	0	0	0	0	2.03
1949 P	.95	.51	1.58	2.09	5.56	6.28	3.24	1.05	1.76	3.03	0	.17	26.22
Q	0	0	.09	T	2.45	2.41	.48	0	0	.56	0	0	5.99
1950 P	.02	.53	.27	.62	3.78	2.01	5.42	2.22	4.79	1.30	.52	0	21.48
Q	0	0	0	0	.72	.68	2.13	.09	2.06	.33	0	0	6.01
1951 P	.38	1.60	1.07	3.15	3.56	10.09	5.83	3.43	3.33	1.70	.52	.12	34.78
Q	0	.05	.01	.02	.05	5.26	3.53	.29	.83	.03	0	0	10.07
1952 P	.21	.52	1.71	2.37	2.96	4.76	5.67	1.34	.42	0	.74	.84	21.54
Q	0	0	0	.12	.64	1.22	1.80	0	0	0	0	0	3.78
1953 P	.10	.78	1.13	2.12	2.98	3.18	1.34	1.56	1.30	.66	2.40	1.16	18.71
Q	0	0	0	.05	.38	1.01	0	.01	0	0	0	0	1.45
1954 P	.04	.29	.21	1.59	6.03	1.18	.93	3.94	1.53	1.84	.01	.45	18.04
Q	0	0	0	0	2.09	0	0	.28	.08	.11	0	0	2.56
1955 P	.36	.21	.17	.61	2.95	3.79	.74	.50	4.67	.17	0	.24	14.41
Q	0	0	0	0	.59	.86	0	0	.88	0	0	0	2.33
1956 P	0.18	0.08	0.30	1.10	0.56	4.22	2.68	1.59	1.24	0.81	0.10	0.05	12.91
Q	0	T	0	.02	0	.97	.17	.14	.05	.01	0	0	1.36
1958 P	0.07	1.24	1.97	1.73	1.50	2.88	4.74	3.51	1.49	.08	.45	.03	19.69
Q	0	.02	0	.17	.03	.18	.50	.22	.01	0	0	0	1.13
1959 P	0.21	.25	3.29	.88	6.26	4.89	3.12	3.32	4.80	1.87	T	.06	28.95
Q	0	.08	.19	.01	1.39	.48	1.66	.21	.10	0	0	0	4.12
1960 P	0.73	0.74	1.30	2.06	5.92	5.59	2.46	1.44	3.04	0.98	0.43	0.02	24.71
Q	0	.03	2.33	.42	2.03	1.70	.09	.01	.22	0	0	0	6.63
1961 P	.08	.15	1.96	1.39	6.86	4.19	2.44	3.48	3.54	.50	1.01	.49	26.09
Q	0	0	.02	.02	1.22	1.06	.00	1.28	.19	0	.03	0	3.82
1962 P	.38	.61	1.80	.46	2.97	4.47	5.65	4.88	2.83	1.95	.17	.40	26.57
Q	.30	.00	.19	.00	T	.26	.18	.32	.06	.06	.00	.00	1.37
1963 P	.32	.00	1.52	1.07	.51	4.25	2.16	2.21	8.27	1.46	.30	.13	22.20
Q	.00	T	.05	.00	.00	.85	.04	.00	1.51	.11	.00	.00	2.56
1964 P	T	.47	1.38	1.20	.99	6.09	4.40	5.88	1.66	.10	.52	.00	22.69
Q	.00	.00	.00	.00	.00	.62	1.37	2.08	T	.00	.00	.00	4.07
1965 P	1.01	1.37	1.57	2.01	11.07	7.45	4.48	1.63	3.99	.46	.14	.57	35.75
Q	.00	.10	.05	.01	6.37	1.94	.31	.00	.12	.00	.00	.00	8.90
1966 P	.05	1.17	.43	.59	.66	3.03	3.97	1.67	1.13	.78	T	.22	13.70
Q	.00	.23	T	.00	.00	.03	.19	T	.00	.00	.00	.00	.45
1967 P	.12	.15	.13	1.62	4.77	6.39	3.12	.33	4.37	1.17	.10	.50	22.77
Q	.00	.00	.00	.00	.08	.41	.20	.00	.69	.27	.00	.00	1.65
AVG P	.30	.54	1.07	1.83	3.53	4.76	3.08	2.56	2.78	1.12	.59	.38	22.54
Q	.02	.03	.14	.09	.77	1.09	.54	.26	.39	.09	.03	.00	3.45

Notes: Station records began April 1939, part year records for 1939 and period of no record, 1957, not included in station averages. No documentation which identifies precipitation amounts shown with a specific gage.

MONTHLY PRECIPITATION AND RUNOFF (INCHES)													WATERSHED 7-H (44.11)	
YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR	
1939 P				2.32	1.86	4.57	1.34	2.39	0.04	0.39	0	0.21	13.12	
Q				0	.04	.85	T	0	0	0	0	0	.89	
1940 P	0.22	0.51	0.58	1.07	2.59	1.34	.33	1.48	1.37	1.01	1.40	.42	12.32	
Q	0	0	.03	0	.30	.06	0	0	0	0	T	0	.39	
1941 P	.39	.41	.22	3.56	2.01	8.46	1.39	2.79	2.51	2.62	.87	.59	25.82	
Q	.01	0	.07	.09	.03	1.06	0	.01	0	.11	.04	0	1.42	
1942 P	.03	.53	1.74	3.55	2.67	8.35	2.10	4.62	6.58	.36	.10	1.02	31.65	
Q	.21	0	.09	.11	0	2.06	.02	.88	1.34	0	0	0	4.71	
1943 P	0	.74	.12	2.43	1.69	6.04	2.32	1.43	.04	.74	.10	.17	15.82	
Q	.03	.26	0	.13	.02	1.31	T	0	0	0	0	0	1.75	
1944 P	.89	.18	1.22	4.65	5.61	3.50	1.67	7.69	.78	.79	1.51	.06	28.55	
Q	0	0	0	.32	2.09	.38	0	.28	0	0	0	0	3.07	
1945 P	.25	.38	.49	2.97	3.63	3.43	3.80	1.35	2.47	.32	.02	1.02	20.13	
Q	0	0	0	.02	.05	.39	.63	T	T	0	0	T	1.09	
1946 P	.66	.01	1.64	.22	2.84	2.64	3.31	3.79	5.64	4.24	1.99	.01	26.99	
Q	T	.01	0	0	0	T	T	.13	1.87	.81	.65	0	3.47	
1947 P	.50	.19	.65	3.71	2.64	5.99	1.49	1.11	.35	.41	1.29	1.16	19.49	
Q	0	0	0	.13	.08	.88	.03	0	0	0	0	0	1.12	
1948 P	.09	1.12	.45	.53	1.70	4.06	4.34	.87	.97	.76	1.21	.41	16.51	
Q	0	0	.65	0	.01	.09	.31	T	0	0	0	0	1.06	
1949 P	.95	.51	1.58	2.09	5.56	6.28	3.24	1.05	1.76	3.03	0	.17	26.22	
Q	0	0	.03	T	2.40	2.52	.18	0	0	.45	0	0	5.58	
1950 P	.02	.53	.27	.62	3.78	2.01	5.42	2.22	4.79	1.30	.52	0	21.48	
Q	0	0	0	0	.50	.51	1.58	.04	1.83	.30	0	0	4.76	
1951 P	.38	1.60	1.07	3.15	3.56	10.09	5.83	3.43	3.33	1.70	.52	.12	34.78	
Q	0	.06	.01	.01	.01	3.74	2.31	.17	.37	.02	0	0	6.70	
1952 P	.21	.52	1.71	2.37	2.96	4.76	5.67	1.34	.42	0	.74	.84	21.54	
Q	0	0	0	.18	.61	.08	1.62	0	0	0	0	0	2.49	
1953 P	.10	.78	1.13	2.12	2.98	3.18	1.34	1.56	1.30	.66	2.40	1.16	18.71	
Q	0	0	0	.03	.36	.90	0	0	0	0	0	0	1.29	
1954 P	.04	.29	.21	1.59	6.03	1.18	.93	3.94	1.53	1.84	.01	.45	18.04	
Q	0	0	0	0	1.68	0	0	.09	0	T	0	0	1.77	
1955 P	.36	.21	.17	.61	2.95	3.79	.74	.50	4.67	.17	0	.24	14.41	
Q	0	0	0	0	.24	.99	0	0	1.22	0	0	0	2.45	
1956 P	0.18	0.08	0.30	1.10	0.56	4.22	2.68	1.59	1.24	0.81	0.10	0.05	12.91	
Q	0	T	0	T	0	.84	.04	T	T	.02	0	0	.90	
1958 P	.07	1.24	1.97	1.73	1.50	2.88	4.74	3.51	1.49	0.08	0.45	.03	19.69	
Q	0	.02	0	T	0	.08	.49	.24	.01	0	0	0	.84	
1959 P	.21	.25	3.29	.88	6.26	4.89	3.12	3.32	4.80	1.87	T	.06	28.95	
Q	0	.18	.21	.01	.90	.45	2.06	.20	1.35	.28	0	0	5.64	
1960 P	0.73	0.74	1.30	2.06	5.92	5.59	2.46	1.44	3.04	0.98	0.43	0.02	24.71	
Q	0	.03	1.95	1.47	2.72	.88	.04	0	.27	0	0	0	7.36	
1961 P	.08	.15	1.96	1.39	6.86	4.19	2.44	3.48	3.54	.50	1.01	.49	26.09	
Q	0	0	T	.02	1.32	.85	0	.22	.22	0	.01	0	2.64	
1962 P	.38	.61	1.80	.46	2.97	4.47	5.65	4.88	2.83	1.95	.17	.40	26.57	
Q	.18	T	.41	.00	.00	.07	1.09	1.31	.06	.16	.00	.00	3.28	
1963 P	.32	.00	1.52	1.07	.51	4.25	2.16	2.21	8.27	1.46	.30	.13	22.20	
Q	.00	T	.08	T	.00	.07	.02	.00	.77	.02	.00	.00	.96	
1964 P	T	.47	1.38	1.20	.99	6.09	4.40	5.88	1.66	.10	.52	.00	22.69	
Q	.00	.00	.00	.00	.00	1.56	.86	1.48	.00	.00	.00	.00	3.90	
1965 P	1.01	1.37	1.57	2.01	11.07	7.45	4.48	1.63	3.99	.46	.14	.57	35.75	
Q	.00	.24	.39	.00	5.43	2.35	.13	.00	.08	.00	.00	.00	8.62	
1966 P	.05	1.17	.43	.59	.66	3.03	3.97	1.67	1.13	.78	T	.22	13.70	
Q	.00	.01	.00	.00	.00	.03	T	.00	.00	.00	.00	.00	.04	
1967 P	.12	.15	.13	1.62	4.77	6.39	3.12	.33	4.37	1.17	.10	.50	22.77	
Q	.00	.00	.00	.00	.08	.91	.83	.00	.21	.17	.00	.00	2.20	
AVG P	.30	.54	1.07	1.83	3.53	4.76	3.08	2.56	2.78	1.12	.59	.38	22.54	
Q	.02	.03	.15	.09	.70	.89	.45	.19	.36	.09	.03	.00	3.00	

Notes: Station records began April 1939, part year records for 1939 and period of no record, 1957, not included in station averages. Precipitation amounts are averages of amounts from individual gages for the years shown as follows: 1939 through 1956; 1958 through 1964 are not documented; 1965 through 1967 B-36-R.

MONTHLY PRECIPITATION AND RUNOFF (INCHES)

WATERSHED 8-H (44.12)

YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR
1939 P			0.91	2.32	1.86	4.57	1.34	2.39	0.04	0.39	0	0.21	14.03
Q			0	.02	.01	.99	.04	.31	0	0	0	0	1.37
1940 P	0.22	0.51	.58	1.07	2.59	1.34	.33	1.48	1.37	1.01	1.40	.42	12.32
Q	0	.03	0	0	T	T	0	0	0	0	T	0	.03
1941 P	.39	.41	.22	3.56	2.01	8.46	1.39	2.79	2.51	2.62	.87	.59	25.82
Q	0	0	.07	.09	.23	1.53	0	0	0	.04	.02	0	1.98
1942 P	.03	.53	1.74	3.55	2.67	8.35	2.10	4.62	6.58	.36	.10	1.02	31.65
Q	0	0	T	.01	0	.35	.03	.49	.19	0	0	0	1.07
1943 P	0	.74	.12	2.43	1.69	6.04	2.32	1.43	.04	.74	.10	.17	15.82
Q	0	.01	0	T	0	2.37	T	0	0	0	0	0	2.38
1944 P	.89	.18	1.22	4.65	5.61	3.50	1.67	7.69	.78	.79	1.51	.06	28.55
Q	0	0	T	.16	1.93	.53	0	.06	0	0	0	0	2.68
1945 P	.25	.38	.49	2.97	3.63	3.43	3.80	1.35	2.47	.32	.02	1.02	20.13
Q	0	0	0	0	.01	.22	.25	0	0	0	0	0	.48
1946 P	.66	.01	1.64	.22	2.84	2.64	3.31	3.79	5.64	4.24	1.99	.01	26.99
Q	0	0	0	0	0	0	0	.06	.11	.02	.01	0	.20
1947 P	.50	.19	.65	3.71	2.64	5.99	1.49	1.11	.35	.41	1.29	1.16	19.49
Q	0	0	0	.08	T	.37	0	0	0	0	0	0	.45
1948 P	.09	1.12	.45	.53	1.70	4.06	4.34	.87	.97	.76	1.21	.41	16.51
Q	0	0	0	0	0	.01	.29	0	0	0	0	0	.30
1949 P	.95	.51	1.58	2.09	5.56	6.28	3.24	1.05	1.76	3.03	0	.17	26.22
Q	0	0	0	0	1.20	.31	.02	0	0	.26	0	0	1.79
1950 P	.02	.53	.27	.62	3.78	2.01	5.42	2.22	4.79	1.30	.52	0	21.48
Q	0	0	0	0	.06	T	.52	0	1.94	.53	0	0	3.05
1951 P	.38	1.60	1.07	3.15	3.56	10.90	5.83	3.43	3.33	1.70	.52	.12	34.78
Q	0	.19	.06	.11	.61	4.32	2.45	.01	.11	0	0	0	7.89
1952 P	.21	.52	1.71	2.37	2.96	4.76	5.67	1.34	.42	0	.74	.84	21.54
Q	0	0	0	.01	.02	.58	1.48	T	0	0	0	0	2.09
1953 P	.10	.78	1.13	2.12	2.98	3.18	1.34	1.56	1.30	.66	2.40	1.16	18.71
Q	0	0	0	.01	.12	.71	0	0	0	0	0	0	.84
1954 P	.04	.29	.21	1.59	6.03	1.18	.93	3.94	1.53	1.84	.01	.45	18.04
Q	0	0	0	.02	1.48	0	0	.05	0	.01	0	0	1.56
1958 P	0.07	1.24	1.97	1.73	1.50	2.88	4.74	3.51	1.49	0.08	0.45	0.03	19.69
Q	0	T	0	.07	0	.01	.24	.15	0	0	0	0	.47
1959 P	.21	.25	3.29	.88	6.26	4.89	3.12	3.32	4.80	1.87	T	.06	28.95
Q	.00	T	T	0	.07	.78	1.69	.01	.24	0	0	0	2.79
1960 P	0.73	0.74	1.30	2.06	5.92	5.59	2.46	1.44	3.04	0.98	0.43	0.02	24.71
Q	0	.03	1.91	.31	1.35	.25	.02	0	.60	0	.03	0	4.50
1961 P	.08	.15	1.96	1.39	6.86	4.19	2.44	3.48	3.54	.50	1.01	.49	26.09
Q	0	0	.02	T	1.00	.63	T	.31	.23	0	.01	0	2.20
1962 P	.38	.61	1.80	.46	2.97	4.47	5.65	4.88	2.83	1.95	.17	.40	26.57
Q	.15	.00	.10	.00	.00	.03	.34	.30	.10	.08	.00	.00	1.10
1963 P	.32	.00	1.52	1.07	.51	4.25	2.16	2.21	8.27	1.46	.30	.13	22.20
Q	.00	T	.08	T	.00	.07	.02	.00	.77	.02	.00	.00	.96
1964 P	T	.47	1.38	1.20	.99	6.09	4.40	5.88	1.66	.10	.52	.00	22.69
Q	.00	.00	.00	.00	.00	.44	.39	.64	.00	.00	.00	.00	1.47
1965 P	1.01	1.37	1.57	2.01	11.07	7.45	4.48	1.63	3.99	.46	.14	.57	35.75
Q	.00	.27	.08	T	4.71	.98	.02	.00	.02	.00	.00	.00	6.08
1966 P	.05	1.17	.43	.59	.66	3.03	3.97	1.67	1.13	.78	T	.22	13.70
Q	.00	.06	.00	.00	.00	.01	.24	.00	.00	.00	.00	.00	.31
1967 P	.12	.15	.13	1.62	4.77	6.39	3.12	.33	4.37	1.17	.10	.50	22.77
Q	.00	.00	.00	.00	.00	.30	.25	.00	.01	.00	.00	.00	.56
AVG P	.31	.57	1.13	1.91	3.67	4.82	3.19	2.68	2.76	1.17	.63	.40	23.24
Q	.01	.02	.09	.04	.51	.63	.33	.10	.19	.04	.00	.00	1.96

Notes: Station records began March 1939, part year records for 1939 and period of no records, 1955 through 1957, not included in station averages. Precipitation amounts are averages of amounts from individual gages for the years shown as follows: 1939 through 1954 are not documented; 1958 through 1967 B-36-R.

MONTHLY PRECIPITATION AND RUNOFF (INCHES)						WATERSHED 9-H (44.13)							
YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR
1939 P				2.35	1.89	4.05	1.30	2.33	0.02	0.44	0	0.19	12.57
Q				0	T	.56	0	.24	0	0	0	0	.80
1940 P	0.13	0.21	0.52	1.07	2.30	1.37	.35	1.44	1.42	1.09	1.44	.50	11.84
Q	0	T	.03	0	.02	.01	0	0	0	0	0	0	.06
1941 P	.42	.38	.16	3.52	1.87	8.00	1.46	2.84	2.43	2.90	.95	.69	25.62
Q	T	0	.06	.14	.10	1.12	0	.02	0	.01	T	0	1.45
1942 P	.11	.53	1.82	3.38	2.75	8.18	1.86	4.35	6.36	.36	.13	1.06	30.89
Q	0	0	T	0	0	2.62	.02	.93	1.31	0	0	0	4.88
1943 P	0	.70	.17	2.42	1.67	6.19	2.21	1.38	.05	.60	.10	.13	15.62
Q	.01	.24	0	.10	.02	1.80	T	0	0	0	0	0	2.17
1944 P	.88	.19	.88	4.44	5.70	3.73	1.71	7.81	.79	.85	1.67	.08	28.73
Q	0	0	0	.03	1.79	.51	0	.10	T	0	0	0	2.43
1945 P	.36	.48	.57	3.16	3.71	3.56	3.70	1.23	2.76	.33	.03	.93	20.82
Q	0	0	0	.02	.01	.81	.64	T	T	0	0	0	1.48
1946 P	.60	T	1.61	.20	2.79	2.84	3.28	4.06	5.84	4.17	1.94	0	27.33
Q	0	0	0	0	0	0	.02	.16	1.07	.47	.41	0	2.13
1947 P	.27	.10	.43	3.58	2.72	5.53	1.56	1.09	.29	.39	1.24	1.00	18.20
Q	0	0	0	.15	.07	.80	.07	0	0	0	0	0	1.09
1948 P	.09	1.06	.45	.46	1.62	3.89	4.39	.99	.95	.70	1.20	.22	16.02
Q	0	0	.50	0	0	.09	.44	T	0	0	0	0	1.03
1949 P	.81	.49	1.64	1.99	5.74	6.77	4.07	.97	1.73	3.06	0	.18	27.45
Q	0	0	.01	0	1.75	2.14	.61	0	0	.66	0	0	5.17
1950 P	T	.41	.23	.61	4.03	1.97	4.91	2.17	4.91	1.34	.50	0	21.08
Q	0	0	0	0	.42	.26	1.05	.03	1.94	.46	0	0	4.16
1951 P	.38	1.55	1.18	3.08	3.28	9.71	5.97	3.38	3.41	1.89	.49	.12	34.44
Q	0	T	T	0	0	3.87	2.49	T	.05	.01	0	0	6.42
1952 P	.23	.54	1.56	2.54	2.86	4.72	5.67	1.10	.43	0	.71	.72	21.08
Q	0	0	0	.03	.30	.58	1.40	0	0	0	0	0	2.31
1953 P	.10	.73	.92	1.95	3.03	3.11	1.28	1.90	1.38	.73	2.45	1.20	18.78
Q	0	0	0	.04	.44	.98	0	.05	0	0	0	0	1.51
1954 P	.04	.33	.27	1.76	6.24	1.17	.93	3.97	1.47	1.82	.01	.47	18.48
Q	0	0	0	0	1.94	0	0	.09	.02	.04	0	0	2.09
AVG P	.29	.51	.83	2.28	3.35	4.72	2.89	2.58	2.28	1.35	.86	.49	22.43
Q	T	.02	.04	.03	.46	1.04	.45	.09	.29	.11	.03	0	2.56

Notes: Station records began April 1939, part year records for 1939 not included in station averages.

MONTHLY PRECIPITATION AND RUNOFF (INCHES)						WATERSHED 10-H (44.14)							
YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR
1939 P				2.35	1.89	4.05	1.30	2.33	0.02	0.44	0	0.19	12.57
Q				0	0	.04	0	.03	0	0	0	0	.07
1940 P	0.13	0.21	0.52	1.07	2.30	1.37	.35	1.44	1.42	1.09	1.44	.50	11.84
Q	0	0	0	0	.01	.02	0	0	0	0	0	0	.03
1941 P	.42	.38	.16	3.52	1.87	8.00	1.46	2.84	2.43	2.90	.95	.69	25.62
Q	.01	0	.03	.01	.01	.28	0	T	0	0	0	0	.34
1942 P	.11	.53	1.82	3.38	2.75	8.18	1.86	4.35	6.36	.36	.13	1.06	30.89
Q	0	0	T	0	0	3.33	.01	1.14	1.45	0	0	0	5.93
1943 P	0	.70	.17	2.42	1.67	6.19	2.21	1.38	.05	.60	.10	.13	15.62
Q	.02	.24	0	.10	T	1.50	0	0	0	0	0	0	1.86
1944 P	.88	.19	.88	4.44	5.70	3.73	1.71	7.81	.79	.85	1.67	.08	28.73
Q	0	0	T	.28	1.49	.63	0	.61	.01	T	0	0	3.02
1945 P	.36	.48	.57	3.16	3.71	3.56	3.70	1.23	2.76	.33	.03	.93	20.82
Q	0	0	0	.20	.38	1.17	.61	.01	T	0	0	T	2.37
1946 P	.60	T	1.61	.20	2.79	2.84	3.28	4.06	5.84	4.17	1.94	0	27.33
Q	0	.10	.02	0	T	.01	.03	.29	1.35	.70	.36	0	2.86
1947 P	.27	.10	.43	3.58	2.72	5.53	1.56	1.09	.29	.39	1.24	1.00	18.20
Q	0	0	0	.30	.12	1.54	.09	0	0	0	0	0	2.05
1948 P	.09	1.06	.45	.46	1.62	3.89	4.39	.99	.95	.70	1.20	.22	16.02
Q	0	0	.30	0	0	.14	.05	0	0	0	0	0	.49
1949 P	.81	.49	1.64	1.99	5.74	6.77	4.07	.97	1.73	3.06	0	.18	27.45
Q	0	0	.01	0	1.51	2.12	.65	0	0	.37	0	0	4.66
1950 P	T	.41	.23	.61	4.03	1.97	4.91	2.17	4.91	1.34	.50	0	21.08
Q	0	0	0	0	.22	.19	.94	.01	1.51	.26	0	0	3.13
1951 P	.38	1.55	1.18	3.08	3.28	9.71	5.97	3.38	3.41	1.89	.49	.12	34.44
Q	0	.04	T	.05	.08	3.71	2.99	.03	.23	.01	0	0	7.14
1952 P	.23	.54	1.56	2.54	2.86	4.72	5.67	1.10	.43	0	.71	.72	21.08
Q	0	0	0	.06	.24	.43	2.15	0	0	0	0	0	2.88
1953 P	.10	.73	.92	1.95	3.03	3.11	1.28	1.90	1.38	.73	2.45	1.20	18.78
Q	0	0	0	.03	.17	.69	0	T	0	0	0	0	.89
1954 P	.04	.33	.27	1.76	6.24	1.17	.93	3.97	1.47	1.82	.01	.47	18.48
Q	0	0	0	0	1.51	0	0	.05	T	.02	0	0	1.58
AVG P	.29	.51	.83	2.28	3.35	4.72	2.89	2.58	2.28	1.35	.86	.49	22.43
Q	T	.03	.02	.07	.38	1.05	.50	.14	.20	.20	.20	T	2.60

MONTHLY PRECIPITATION AND RUNOFF (INCHES)							WATERSHED 11-H (44.15)						
YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR
1939 P				2.35	1.89	4.05	1.30	2.33	0.02	0.44	0	0.19	12.57
Q				0	0	.12	0	.02	0	0	0	0	.14
1940 P	0.13	0.21	0.52	1.07	2.30	1.37	.35	1.44	1.42	1.09	1.44	0.50	11.84
Q	0	0	0	0	.11	.14	0	0	0	0	0	0	.25
1941 P	.42	.38	.16	3.52	1.87	8.00	1.46	2.84	2.43	2.90	.95	.69	25.62
Q	0	0	T	.03	0	2.43	0	.03	.02	.53	.11	0	3.15
1942 P	.11	.53	1.82	3.38	2.75	8.18	1.86	4.35	6.36	.36	.13	1.06	30.89
Q	.10	0	.17	.02	0	1.41	T	.53	.49	0	0	0	2.72
1943 P	0	.70	.17	2.42	1.67	6.19	2.21	1.38	.05	.60	.10	.13	15.62
Q	0	.07	0	.10	.01	1.92	T	0	0	0	0	0	2.10
1944 P	.88	.19	.88	4.44	5.70	3.73	1.71	7.81	.79	.85	1.67	.08	28.73
Q	0	0	T	.60	1.83	.77	0	1.46	.02	T	0	0	4.68
1945 P	.36	.48	.57	3.16	3.71	3.56	3.70	1.23	2.76	.33	.03	.93	20.82
Q	0	0	0	.22	.63	1.19	.48	T	0	0	0	0	2.52
1946 P	.60	T	1.61	.20	2.79	2.84	3.28	4.06	5.84	4.17	1.94	0	27.33
Q	0	0	0	0	0	.18	.18	.77	1.59	.56	.30	0	3.58
1947 P	.27	.10	.43	3.58	2.72	5.53	1.56	1.09	.29	.39	1.24	1.00	18.20
Q	0	0	0	.66	.04	1.73	.02	0	0	0	0	0	2.45
1948 P	.09	1.06	.45	.46	1.62	3.89	4.39	.99	.95	.70	1.20	.22	16.02
Q	0	0	.20	0	0	.02	.62	T	0	0	0	0	.84
1949 P	.81	.49	1.64	1.99	5.74	6.77	4.07	.97	1.73	3.06	0	.18	27.45
Q	0	0	.02	T	1.90	2.37	1.18	0	.01	1.48	0	0	6.96
1950 P	T	.41	.23	.61	4.03	1.97	4.91	2.17	4.91	1.34	.50	0	21.08
Q	0	0	0	0	.34	.15	.97	0	2.62	.77	0	0	4.85
1951 P	.38	1.55	1.18	3.08	3.28	9.71	5.97	3.38	3.41	1.89	.49	.12	34.44
Q	0	0	0	.35	.91	5.34	3.04	.14	.58	.05	0	0	10.41
1952 P	.23	.54	1.56	2.54	2.86	4.72	5.67	1.10	.43	0	.71	.72	21.08
Q	0	0	0	.16	.15	1.72	2.71	0	0	0	0	0	4.74
1953 P	.10	.73	.92	1.95	3.03	3.11	1.28	1.90	1.38	.73	2.45	1.20	18.78
Q	0	0	0	T	.27	.85	0	0	0	0	0	0	1.12
1954 P	.04	.33	.27	1.76	6.24	1.17	.93	3.97	1.47	1.82	.01	.47	18.48
Q	0	0	0	.19	1.87	0	0	.11	0	.01	0	0	2.18
AVG P	.29	.51	.83	2.28	3.35	4.72	2.89	2.58	2.28	1.35	.86	.49	22.43
Q	.01	T	.03	.16	.54	1.35	.61	.20	.36	.23	.03	0	3.52

Notes: Station records began April 1939, part year records for 1939 not included in station averages.

MONTHLY PRECIPITATION AND RUNOFF (INCHES)							WATERSHED 12-H (44.16)						
YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR
1939 P				2.35	1.89	4.05	1.30	2.33	0.02	0.44	0	0.19	12.57
Q				0	0	.18	0	.20	0	0	0	0	.38
1940 P	0.13	0.21	0.52	1.07	2.30	1.37	.35	1.44	1.42	1.09	1.44	.50	11.84
Q	0	.01	.16	0	0	.23	0	0	T	0	T	0	.40
1941 P	.42	.38	.16	3.52	1.87	8.00	1.46	2.84	2.43	2.90	.95	.69	25.62
Q	.03	.01	.16	.08	.10	1.10	0	0	0	.57	.14	0	2.19
1942 P	.11	.53	1.82	3.38	2.75	8.18	1.86	4.35	6.36	.36	.13	1.06	30.89
Q	.17	0	.10	.11	.02	1.50	.02	.72	1.20	0	0	0	3.84
1943 P	0	.70	.17	2.42	1.67	6.19	2.21	1.38	.05	.60	.10	.13	15.62
Q	.14	.06	T	.24	T	2.22	T	0	0	0	0	0	2.66
1944 P	.88	.19	.88	4.44	5.70	3.73	1.71	7.81	.79	.85	1.67	.08	28.73
Q	0	T	.07	1.66	2.64	.99	0	1.02	0	0	0	0	6.38
1945 P	.36	.48	.57	3.16	3.71	3.56	3.70	1.23	2.76	.33	.03	.93	20.82
Q	0	0	0	.07	.14	.64	.46	T	T	0	0	T	1.31
1946 P	.60	T	1.61	.20	2.79	2.84	3.28	4.06	5.84	4.17	1.94	0	27.33
Q	0	0	T	0	0	.25	.45	.90	2.12	1.16	.73	0	5.61
1947 P	.27	.10	.43	3.58	2.72	5.53	1.56	1.09	.29	.39	1.24	1.00	18.20
Q	0	0	0	.90	.45	2.51	.05	0	0	0	0	0	3.91
1948 P	.09	1.06	.45	.46	1.62	3.89	4.39	.99	.95	.70	1.20	.22	16.02
Q	0	0	.25	0	T	.27	1.34	.01	0	0	0	0	1.87
1949 P	.81	.49	1.64	1.99	5.74	6.77	4.07	.97	1.73	3.06	0	.18	27.45
Q	0	0	.08	.02	2.88	1.98	1.23	0	.13	1.33	0	0	7.65
1950 P	T	.41	.23	.61	4.03	1.97	4.91	2.17	4.91	1.34	.50	0	21.08
Q	0	0	0	0	.74	.26	1.14	T	3.48	.91	0	0	6.53
1951 P	.38	1.55	1.18	3.08	3.28	9.71	5.97	3.38	3.41	1.89	.49	.12	34.44
Q	0	0	.10	.47	.81	4.46	2.81	.10	.55	T	0	0	9.30
1952 P	.23	.54	1.56	2.54	2.86	4.72	5.67	1.10	.43	0	.71	.72	21.08
Q	0	0	0	.10	.19	1.92	2.73	0	0	0	0	0	4.94
1953 P	.10	.73	.92	1.95	3.03	3.11	1.28	1.90	1.38	.73	2.45	1.20	18.78
Q	0	0	0	.01	1.59	.93	0	0	0	0	0	0	2.53
1954 P	.04	.33	.27	1.76	6.24	1.17	.93	3.97	1.47	1.82	.01	.47	18.48
Q	0	0	0	.30	2.75	.01	0	.24	.01	.07	0	0	3.38
AVG P	.29	.51	.83	2.28	3.35	4.72	2.89	2.58	2.28	1.35	.86	.49	22.43
Q	.02	.01	.06	.26	.82	1.28	.68	.20	.50	.27	.06	T	4.16

Notes: Station records began April 1939, part year records for 1939 not included in station averages.

MONTHLY PRECIPITATION AND RUNOFF (INCHES)							WATERSHED 13-H (44.17)						
YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR
1939 P				2.42	1.95	3.61	1.26	2.26	0.02	0.46	0	0.27	12.25
Q				0	.01	.39	0	.21	0	0	0	0	.61
1940 P	0.16	0.25	0.59	1.12	2.06	1.32	.33	1.22	1.39	1.04	1.56	.41	11.45
Q	0	0	0	0	.01	.16	0	0	0	0	T	0	.17
1941 P	.43	.37	.16	3.60	1.74	8.12	1.46	2.85	2.43	2.59	.96	.73	25.44
Q	T	0	.05	.26	0	2.40	0	.04	.02	.22	.19	0	3.18
1942 P	.02	.54	1.73	3.53	2.72	8.16	1.88	4.41	6.28	.37	.13	1.19	30.96
Q	.31	0	.09	.19	.13	2.27	.01	.78	.18	0	0	0	3.96
1943 P	0	.72	.18	2.45	1.79	6.16	2.09	1.46	.07	.56	.10	.15	15.73
Q	0	.06	0	.66	.32	2.78	.03	T	0	0	0	0	3.85
1944 P	.93	.41	1.41	5.21	5.82	3.73	1.79	7.98	.82	.86	1.60	.05	30.61
Q	0	0	0	.03	.96	.67	0	2.19	.13	.03	0	0	4.01
1945 P	.38	.49	.58	2.99	3.82	3.57	3.22	1.26	2.71	.32	.04	1.05	20.43
Q	0	0	0	.01	.42	1.06	.43	.02	0	0	0	0	1.94
1946 P	.57	T	1.63	.18	2.81	2.71	3.67	4.05	5.56	3.82	1.93	.02	26.95
Q	0	.04	T	0	T	.08	.13	.77	1.90	.94	.52	0	4.38
1947 P	.31	.15	.50	3.66	2.74	5.32	1.87	1.22	.38	.39	1.23	1.36	19.13
Q	0	0	0	.44	.01	1.35	.11	0	0	0	0	0	1.91
1948 P	.13	1.31	.55	.45	1.62	3.84	4.66	.81	1.00	.72	1.27	.33	16.69
Q	0	0	.10	0	0	.16	1.13	0	0	0	0	0	1.39
1949 P	1.08	.49	1.97	2.27	6.45	7.49	4.18	1.17	1.98	3.48	0	.22	30.78
Q	0	0	.01	0	2.32	2.82	1.16	0	.01	1.05	0	0	7.37
1950 P	T	.61	.29	.93	4.49	2.12	5.24	2.38	5.06	1.51	.53	0	23.16
Q	0	0	0	0	.04	.14	1.07	.03	2.33	.64	0	0	4.25
1951 P	.38	1.88	1.58	3.54	3.71	10.73	6.63	3.72	3.69	2.05	.51	.13	38.55
Q	0	0	.06	.09	.48	5.03	2.89	T	0	T	0	0	8.55
1952 P	.24	.69	1.85	3.04	3.14	5.01	6.02	.97	.44	0	.97	1.02	23.39
Q	0	0	0	.01	.53	.63	1.80	0	0	0	0	0	2.97
1953 P	.15	.82	1.14	2.06	3.64	3.51	1.74	1.71	1.68	.82	2.79	1.39	21.45
Q	0	0	0	0	.35	1.00	0	0	0	0	0	0	1.35
1954 P	.04	.30	.28	2.13	6.91	1.28	.93	4.19	1.58	2.11	.01	.50	20.26
Q	0	0	0	.15	3.06	0	0	.02	T	.06	0	0	3.29
AVG P	.32	.60	.96	2.48	3.56	4.87	3.05	2.63	2.34	1.38	.91	.57	23.67
Q	.02	.01	.02	.12	.58	1.37	.58	.26	.30	.20	.05	0	3.51

Notes: Station records began April 1939, part year records for 1939 not included in station averages.

MONTHLY PRECIPITATION AND RUNOFF (INCHES)							WATERSHED 14-H (44.18)						
YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR
1939 P				2.42	1.95	3.61	1.26	2.26	0.02	0.46	0	.27	12.25
Q				0	0	.23	0	.02	0	0	0	0	.25
1940 P	0.16	0.25	0.59	1.12	2.06	1.32	.33	1.22	1.39	1.04	1.56	.41	11.45
Q	0	.10	.05	0	.07	.01	0	0	0	0	0	0	.23
1941 P	.43	.37	.16	3.60	1.74	8.12	1.46	2.85	2.43	2.59	.96	.73	25.44
Q	.02	T	.08	.26	.17	1.01	0	T	0	T	T	0	1.54
1942 P	.02	.54	1.73	3.53	2.72	8.16	1.88	4.41	6.28	.37	.13	1.19	30.96
Q	.04	0	T	.03	0	3.57	.06	1.72	2.61	0	0	0	8.03
1943 P	0	.72	.18	2.45	1.79	6.16	2.09	1.46	.07	.56	.10	.15	15.73
Q	0	.04	.15	0	.46	.04	1.98	0	0	0	0	0	2.67
1944 P	.93	.41	1.41	5.21	5.82	3.73	1.79	7.98	.82	.86	1.60	.05	30.61
Q	0	0	0	.47	2.44	.87	0	2.01	.06	.02	0	0	5.87
1945 P	.38	.49	.58	2.99	3.82	3.57	3.22	1.26	2.71	.32	.04	1.05	20.43
Q	0	0	0	.20	.50	.98	.19	T	T	0	0	T	1.87
1946 P	.57	T	1.63	.18	2.81	2.71	3.67	4.05	5.56	3.82	1.93	.02	26.95
Q	.03	0	0	0	T	.05	.19	.42	1.34	.77	.54	0	3.34
1947 P	.31	.15	.50	3.66	2.74	5.32	1.87	1.22	.38	.39	1.23	1.36	19.13
Q	0	0	0	.48	.01	1.84	.08	0	0	0	0	0	2.41
1948 P	.13	1.31	.55	.45	1.62	3.84	4.66	.81	1.00	.72	1.27	.33	16.69
Q	0	0	.30	0	0	.03	.80	0	0	0	0	0	1.13
1949 P	1.08	.49	1.97	2.27	6.45	7.49	4.18	1.17	1.98	3.48	0	.22	30.78
Q	0	0	0	0	3.27	3.21	1.04	0	.01	1.07	0	0	8.60
1950 P	T	.61	.29	.93	4.49	2.12	5.24	2.38	5.06	1.51	.53	0	23.16
Q	0	0	0	0	.01	.35	1.38	.05	2.18	.54	0	0	4.51
1951 P	.38	1.88	1.58	3.54	3.71	10.73	6.63	3.72	3.69	2.05	.51	.13	38.55
Q	0	0	.07	.07	.58	5.41	3.28	.02	1.10	0	0	0	9.53
1952 P	.24	.69	1.85	3.04	3.14	5.01	6.02	.97	.44	0	.97	1.02	23.39
Q	0	0	0	.08	.49	.77	2.04	0	0	0	0	0	3.38
1953 P	.15	.82	1.14	2.06	3.64	3.51	1.74	1.71	1.68	.82	2.79	1.39	21.45
Q	0	0	0	0	.49	.87	0	0	0	0	0	0	1.36
1954 P	.04	.30	.28	2.13	6.91	1.28	.93	4.19	1.58	2.11	.01	.50	20.26
Q	0	0	0	.12	2.56	0	0	.01	0	.04	0	0	2.73
AVG P	.32	.60	.96	2.48	3.56	4.87	3.05	2.63	2.34	1.38	.91	.57	23.67
Q	.02	.01	.02	.12	.58	1.37	.58	.26	.30	.20	.05	0	3.51

MONTHLY PRECIPITATION AND RUNOFF (INCHES)							WATERSHED 15-H (44.19)						
YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR
1939 P				2.73	1.87	3.31	1.17	2.08	0.11	0.44	0	0.13	11.84
Q				0	T	.46	0	.14	0	0	0	0	.60
1940 P	0.18	0.19	0.40	1.01	1.84	1.38	0.36	1.05	1.41	1.01	1.57	.47	10.87
Q	0	0	.03	0	T	.04	0	0	0	0	0	0	.07
1941 P	.46	.42	.17	3.58	1.96	8.26	1.45	2.79	2.46	2.26	.88	.69	25.38
Q	.02	0	.06	.16	.13	2.05	0	.02	0	.01	.02	0	2.47
1942 P	.06	.48	1.72	3.65	2.72	8.52	1.90	4.34	5.94	.39	.11	1.03	30.86
Q	.06	0	.05	.05	0	3.32	.10	1.71	1.95	0	0	0	7.24
1943 P	0	.72	.13	2.41	1.71	6.22	2.08	1.46	.08	.65	.09	.16	15.71
Q	.03	.41	.01	.37	.16	2.23	.02	.01	0	0	0	0	3.24
1944 P	.89	.11	.86	4.55	5.80	3.77	1.74	8.06	1.00	.92	1.61	.11	29.42
Q	0	0	0	.14	1.96	.77	0	1.26	.15	.02	0	0	4.30
1945 P	.39	.53	.61	2.91	3.58	3.38	3.20	1.28	2.75	.33	.03	1.15	20.14
Q	0	0	0	T	.04	1.00	.47	T	.01	0	0	T	1.52
1946 P	.49	T	1.62	.23	2.84	2.84	3.47	4.06	5.59	3.85	1.93	.02	26.94
Q	.05	.16	0	0	0	T	.23	.47	1.93	1.05	.83	0	4.72
1947 P	.25	.10	.43	3.52	2.73	5.34	1.78	1.23	.33	.41	1.31	1.12	18.55
Q	0	0	0	.56	.47	1.95	.34	0	0	0	0	0	3.32
1948 P	.11	1.07	.41	.50	1.56	3.60	4.55	.89	1.06	.74	1.21	.36	16.06
Q	0	0	.50	0	0	.37	1.30	.01	0	0	0	0	2.18
1949 P	.91	.50	1.82	2.04	5.85	7.34	4.12	1.12	1.88	3.26	0	.17	29.01
Q	0	0	.04	0	2.06	2.70	1.02	0	0	1.09	0	0	6.91
1950 P	.03	.53	.21	.68	4.20	2.08	5.20	2.42	4.90	1.50	.57	0	22.32
Q	0	0	0	0	.75	.96	1.86	.05	2.07	.31	0	0	6.00
1951 P	.38	1.73	1.16	3.36	3.46	10.29	6.24	3.30	3.49	1.82	.52	.10	35.85
Q	0	0	T	.02	.02	5.57	3.65	.57	.78	.03	0	0	10.64
1952 P	.21	.56	1.68	2.71	2.93	4.77	5.65	1.00	.42	0	.83	.72	21.48
Q	0	0	0	.03	.30	.99	1.75	0	0	0	0	0	3.07
1953 P	.10	.75	.97	2.01	3.53	3.42	1.72	1.65	1.60	.82	2.56	1.30	20.43
Q	0	0	0	.02	.75	.93	0	0	.01	0	0	0	1.71
1954 P	.04	.25	.28	1.73	6.91	1.23	.93	4.08	1.66	2.00	.01	.48	19.60
Q	0	0	0	.10	2.79	0	0	.14	.17	.21	0	0	3.41
AVG P	.30	.53	.83	2.33	3.44	4.83	2.96	2.58	2.30	1.33	.88	.53	22.84
Q	.01	.04	.05	.10	.63	1.53	.72	.28	.47	.18	.06	T	4.07

Notes: Station records began April 1939, part year records for 1939 not included in station averages.

MONTHLY PRECIPITATION AND RUNOFF (INCHES)							WATERSHED 16-H (44.20)						
YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR
1939 P				2.73	1.87	3.31	1.17	2.08	0.11	0.44	0	0.13	11.84
Q				0	T	.21	.01	0	0	0	0	0	.22
1940 P	0.18	0.19	0.40	1.01	1.84	1.38	0.36	1.05	1.41	1.01	1.57	0.47	10.87
Q	0	0	0	0	.12	.28	0	0	0	0	0	0	.40
1941 P	.46	.42	.17	3.58	1.96	8.26	1.45	2.79	2.46	2.26	.88	.69	25.38
Q	T	0	.02	.22	.07	1.56	0	.06	.01	.07	.02	0	2.03
1942 P	.06	.48	1.72	3.65	2.72	8.52	1.90	4.34	5.94	.39	.11	1.03	30.86
Q	.23	0	.03	.07	.05	2.98	.02	.99	1.15	0	0	0	5.52
1943 P	0	.72	.13	2.41	1.71	6.22	2.08	1.46	.08	.65	.09	.16	15.71
Q	0	.02	T	.27	.11	2.23	.03	T	0	0	0	0	2.66
1944 P	.89	.11	.86	4.55	5.80	3.77	1.74	8.06	1.00	.92	1.61	.11	29.42
Q	0	0	T	.22	1.96	1.13	0	1.87	.29	.12	0	0	5.59
1945 P	.39	.53	.61	2.91	3.58	3.38	3.20	1.28	2.75	.33	.03	1.15	20.14
Q	0	0	0	.02	.55	1.18	.48	.04	T	0	0	T	2.27
1946 P	.49	T	1.62	.23	2.84	2.84	3.47	4.06	5.59	3.85	1.93	.02	26.94
Q	0	0	0	0	.01	.16	.35	.76	1.91	.99	.53	0	4.71
1947 P	.25	.10	.43	3.52	2.73	5.34	1.78	1.23	.33	.41	1.31	1.12	18.55
Q	0	0	0	.50	.02	2.25	.27	0	0	0	0	0	3.04
1948 P	.11	1.07	.41	.50	1.56	3.60	4.55	.89	1.06	.74	1.21	.36	16.06
Q	0	0	.40	0	0	.05	.99	0	0	0	0	0	1.44
1949 P	.91	.50	1.82	2.04	5.85	7.34	4.12	1.12	1.88	3.26	0	.17	29.01
Q	0	0	.06	0	2.06	2.46	.89	0	.84	.04	0	0	6.31
1950 P	.03	.53	.21	.68	4.20	2.08	5.20	2.42	4.90	1.50	.57	0	22.32
Q	0	0	0	0	.03	.24	1.35	.13	2.56	.66	0	0	4.97
1951 P	.38	1.73	1.16	3.36	3.46	10.29	6.24	3.30	3.49	1.82	.52	.10	35.85
Q	0	.32	.08	.06	.39	5.58	3.31	.02	.04	T	0	0	9.80
1952 P	.21	.56	1.68	2.71	2.93	4.77	5.65	1.00	.42	0	.83	.72	21.48
Q	0	0	0	.01	.52	.88	2.12	0	0	0	0	0	3.53
1953 P	.10	.75	.97	2.01	3.53	3.42	1.72	1.65	1.60	.82	2.56	1.30	20.43
Q	0	0	0	T	.83	1.10	.02	.02	.01	0	.03	0	2.01
1954 P	.04	.25	.28	1.73	6.91	1.23	.93	4.08	1.66	2.00	.01	.48	19.60
Q	0	0	0	.33	3.80	0	0	.02	T	.28	0	0	4.43
AVG P	.30	.53	.83	2.33	3.44	4.83	2.96	2.58	2.30	1.33	.88	.53	22.84
Q	.01	.04	.05	.10	.63	1.53	.72	.28	.47	.18	.06	T	4.07

MONTHLY PRECIPITATION AND RUNOFF (INCHES)													WATERSHED 17-H (44.21)	
YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR	
1939 P				2.73	1.87	3.31	1.17	2.08	0.11	0.44	0	0.13	11.84	
Q				0	.11	.66	.03	.44	0	0	0	0	1.24	
1940 P	0.18	0.19	0.40	1.01	1.84	1.38	.36	1.05	1.41	1.01	1.57	.47	10.87	
Q	0	0	T	0	T	.01	0	0	0	0	T	0	.01	
1941 P	.46	.42	.17	3.58	1.96	8.26	1.45	2.79	2.46	2.26	.88	.69	25.38	
Q	.04	.03	.09	.22	.30	1.76	0	.01	0	.12	.06	0	2.63	
1942 P	.06	.48	1.72	3.65	2.72	8.52	1.90	4.34	5.94	.39	.11	1.03	30.86	
Q	.01	0	.01	.11	.04	2.14	.11	.96	.70	0	0	0	4.08	
1943 P	0	.72	.13	2.41	1.71	6.22	2.08	1.46	.08	.65	.09	.16	15.71	
Q	0	.07	0	.23	T	3.04	.08	0	0	0	0	0	3.42	
1944 P	.89	.11	.86	4.55	5.80	3.77	1.74	8.06	1.00	.92	1.61	.11	29.42	
Q	0	0	0	1.95	3.20	1.14	0	1.83	0	0	0	0	8.12	
1945 P	.39	.53	.61	2.91	3.58	3.38	3.20	1.28	2.75	.33	.03	1.15	20.14	
Q	0	0	0	.02	.09	.78	.44	.02	.01	0	0	T	1.36	
1946 P	.49	T	1.62	.23	2.84	2.84	3.47	4.06	5.59	3.85	1.93	.02	26.94	
Q	T	0	0	0	0	.04	.39	1.09	1.69	.71	.42	0	4.34	
1947 P	.25	.10	.43	3.52	2.73	5.34	1.78	1.23	.33	.41	1.31	1.12	18.55	
Q	0	0	0	.48	.11	1.75	.15	0	0	0	0	0	2.49	
1948 P	.11	1.07	.41	.50	1.56	3.60	4.55	.89	1.06	.74	1.21	.36	16.06	
Q	0	0	.15	0	0	.27	1.50	.01	0	0	0	0	1.93	
1949 P	.91	.50	1.82	2.04	5.85	7.34	4.12	1.12	1.88	3.26	0	.17	29.01	
Q	0	0	.02	0	2.68	1.95	.54	0	.12	1.31	0	0	6.62	
1950 P	.03	.53	.21	.68	4.20	2.08	5.20	2.42	4.90	1.50	.57	0	22.32	
Q	0	0	0	0	.54	.40	1.23	0	2.95	.85	0	0	5.97	
1951 P	.38	1.73	1.16	3.36	3.46	10.29	6.24	3.30	3.49	1.82	.52	.10	35.85	
Q	0	.01	.07	.31	.92	5.57	2.69	.06	.14	T	0	0	9.77	
1952 P	.21	.56	1.68	2.71	2.93	4.77	5.65	1.00	.42	0	.83	.72	21.48	
Q	0	0	0	.01	.01	1.11	1.78	0	0	0	0	0	2.91	
1953 P	.10	.75	.97	2.01	3.53	3.42	1.72	1.65	1.60	.82	2.56	1.30	20.43	
Q	0	0	0	T	.37	.74	0	0	0	0	0	0	1.11	
1954 P	.04	.25	.28	1.73	6.91	1.23	.93	4.08	1.66	2.00	.01	.48	19.60	
Q	0	0	0	.29	3.20	T	0	.17	.05	.15	0	0	3.86	
AVG P	.30	.53	.83	2.33	3.44	4.83	2.96	2.58	2.30	1.33	.88	.53	22.84	
Q	T	.01	.02	.24	.76	1.38	.59	.28	.38	.21	.03	T	3.90	

Notes: Station records began April 1939, part year records for 1939 not included in station averages.

MONTHLY PRECIPITATION AND RUNOFF (INCHES)													WATERSHED 18-H (44.22)	
YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR	
1939 P							1.53	2.42	0.03	0.40	0	0.15	4.53	
Q							0	.33	0	0	0	0	.33	
1940 P	0.19	0.20	0.44	0.97	2.27	1.36	.33	1.67	1.53	1.10	1.33	.38	11.77	
Q	0	.05	.03	0	.14	.12	0	T	.13	0	0	0	.47	
1941 P	.37	.41	.16	3.55	1.90	8.11	1.35	2.40	2.35	2.74	.97	.68	24.99	
Q	.09	T	.20	.01	.01	1.14	0	.02	0	.27	T	0	1.74	
1942 P	.05	.53	1.82	3.69	2.50	7.92	1.71	4.52	6.48	.32	.15	1.23	30.92	
Q	.06	0	.04	.01	T	1.22	T	.21	.42	0	0	0	1.96	
1943 P	0	.69	.11	2.31	1.73	5.89	2.18	1.43	.02	.57	.12	.14	15.19	
Q	0	.34	0	.10	.04	1.32	.03	0	0	0	0	0	1.83	
1944 P	.94	.10	.75	4.09	5.67	3.66	2.00	7.25	.60	.78	1.37	.04	27.25	
Q	0	0	.02	.19	1.36	.22	0	.98	T	0	.02	0	2.79	
1945 P	.26	.34	.47	3.03	3.73	3.57	3.50	1.29	2.31	.32	.04	.91	19.77	
Q	0	0	0	.11	.30	1.10	.24	T	T	0	0	T	1.75	
1946 P	.52	T	1.45	.24	2.96	2.68	3.50	3.97	5.64	3.89	1.82	0	26.67	
Q	.03	0	0	0	0	.01	.02	.52	.63	.29	.39	0	1.89	
1947 P	.21	.12	.37	3.56	2.66	5.50	1.65	1.04	.33	.42	1.11	1.02	17.99	
Q	0	0	0	.37	.08	1.56	.08	0	0	0	0	0	2.09	
1948 P	.05	1.11	.42	.50	1.67	3.92	3.96	.78	1.13	.69	1.16	.32	15.71	
Q	0	0	0	0	0	.01	.07	T	0	0	0	0	.08	
1949 P	.89	.41	1.59	2.09	.5.78	6.21	2.71	1.05	1.64	3.10	0	.17	25.64	
Q	0	0	0	0	.98	1.03	.05	0	0	.58	0	0	2.64	
1950 P	.01	.44	.23	.62	3.70	1.95	5.70	2.08	5.21	1.26	.49	0	21.69	
Q	0	0	0	0	.03	.02	.34	.01	1.37	.04	0	0	1.81	
1951 P	.34	1.53	1.07	3.01	3.90	9.83	5.60	3.72	3.13	1.82	.48	.06	34.49	
Q	0	T	0	.04	.49	4.17	2.02	.12	.06	.02	0	0	6.92	
1952 P	.20	.42	1.31	2.50	2.99	4.75	5.75	1.55	.42	0	.71	.84	21.44	
Q	0	0	0	.01	.50	.50	1.40	0	0	0	0	0	2.41	
1953 P	.10	.75	1.14	2.07	2.90	3.07	1.22	1.28	1.38	.62	2.51	1.17	18.21	
Q	0	0	0	T	.08	.58	0	0	0	0	T	0	.66	
1954 P	.04	.30	.26	1.63	6.10	1.05	1.00	4.17	1.46	1.67	.01	.47	18.16	
Q	0	0	0	T	1.28	0	0	.02	T	0	0	0	1.30	
1955 P	.34	.23	.20	.57	2.90	4.18	1.03	NR	NR	NR	NR	NR	9.45	
Q	0	0	0	0	.01	.03	0	NR	NR	NR	NR	NR	.04	
1957 P	0.13	0.06	1.67	2.82	6.38	11.12	0.09	5.44	0.59	1.22	0.64	0.11	30.27	
Q	0	0	0	.15	.18	3.59	0	.38	0	0	0	0	4.30	
1958 P	.07	1.59	2.06	1.66	1.44	2.56	4.47	3.57	1.54	.07	.42	.04	19.49	
Q	0	.03	0	T	0	.45	.13	.13	0	0	0	0	.74	
1959 P	.19	.28	3.44	.86	6.74	4.84	3.08	3.08	4.43	1.71	T	.07	28.72	
Q	0	.20	0	0	.64	.66	2.05	.01	.01	0	0	0	3.57	
1960 P	0.72	0.68	1.26	2.14	5.82	5.74	2.34	1.31	3.48	1.01	0.40	0.03	24.93	
Q	0	.01	.51	.21	1.76	.62	.02	0	.37	0	0	0	3.50	
1961 P	0.08	.22	2.05	1.58	6.50	4.20	2.49	3.63	3.47	.43	1.01	.62	26.28	
Q	0	0	T	.01	.42	.56	.01	.14	.03	0	0	0	1.17	
1962 P	.39	.59	1.85	.51	3.04	4.54	5.55	4.78	2.62	1.78	.17	.40	26.22	
Q	.20	.00	.12	.00	.01	.06	.48	.36	.01	.06	.00	.00	1.30	
1963 P	.32	.00	1.52	1.15	.48	4.23	2.17	2.32	8.72	1.60	.30	.13	22.94	
Q	.00	T	.01	.00	.00	.04	.00	.00	.38	.08	.00	.00	.51	
1964 P	T	.47	1.38	1.15	1.10	5.77	4.82	6.08	1.68	.08	.52	.00	23.05	
Q	.00	.00	.00	.00	.00	.61	.46	.58	.00	.00	.00	.00	1.65	
1965 P	1.01	1.37	1.57	1.91	11.06	6.83	4.43	1.57	4.34	.43	.14	.57	35.23	
Q	.00	.47	.12	T	6.07	1.65	.50	.00	.10	.00	.00	.00	8.91	
1966 P	.05	1.17	.43	.72	.94	2.87	4.53	1.71	1.19	.81	T	.22	14.64	
Q	.00	.03	.00	.00	T	.07	.33	.00	T	.00	.00	.00	.43	
1967 P	.12	.15	.13	1.59	4.80	6.45	2.82	.33	4.43	1.35	.10	.50	22.77	
Q	.00	.00	.00	.00	.04	.89	.30	.00	.22	.04	.00	.01	1.50	
AVG P	.29	.55	1.16	2.01	3.93	5.14	3.15	2.90	2.80	1.20	.65	.41	24.19	
Q	.02	.02	.04	.07	.56	.89	.34	.15	.15	.05	.02	.00	2.31	

Notes: Station records began July 1939, part year records for 1939 and 1955 and no records for 1956, not included in station averages. Precipitation amounts are averages of amounts from individual gages for the years shown as follows: 1939 through 1955; 1957 through 1962 are not documented; 1962 B-33-R; 1963 through 1967 B-39-R.

MONTHLY PRECIPITATION AND RUNOFF (INCHES)						WATERSHED 19-H (44.23)							
YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR
1941 P				3.55	1.68	7.89	1.41	2.54	2.41	2.68	0.91	0.47	23.54
Q				.18	.01	2.55	0	.06	.05	.98	.18	.01	4.02
1942 P	0.03	0.49	1.77	3.75	2.62	7.98	1.62	4.50	6.46	.31	.06	1.07	30.66
Q	.29	0	.26	.31	0	1.66	T	1.22	2.30	0	0	0	6.04
1943 P	0	.65	.11	2.57	1.77	5.75	2.36	1.43	.08	.52	.10	.14	15.48
Q	0	.07	0	.01	T	.84	.02	0	0	0	0	0	.94
1944 P	.88	.15	.95	4.62	5.64	3.89	1.82	7.79	.67	.72	1.56	.05	28.74
Q	0	0	.03	.72	2.23	.65	0	1.46	0	0	0	0	5.09
1945 P	.32	.41	.58	3.31	4.23	3.86	3.73	1.11	3.01	.34	.04	.75	21.69
Q	0	0	0	.11	.16	.66	.38	0	.01	0	0	0	1.32
1946 P	.44	T	1.63	.21	2.82	2.96	3.60	4.14	6.32	4.17	2.12	.02	28.43
Q	T	0	0	0	0	.29	.25	.63	1.84	.74	.47	0	4.22
1947 P	.45	.16	.68	3.83	2.61	5.29	1.74	1.08	.32	.38	1.24	1.09	18.87
Q	0	0	0	.73	.05	1.83	.05	0	0	0	0	0	2.66
1948 P	.08	1.16	.38	.44	1.70	3.95	4.10	.85	1.10	.69	1.17	.31	15.93
Q	0	0	.25	0	0	.08	.66	0	0	0	0	0	.99
1949 P	.74	.45	1.63	1.90	5.65	6.59	3.86	1.00	1.79	3.06	0	.19	26.86
Q	0	0	.02	0	1.79	2.27	.99	0	.02	1.31	0	0	6.40
1950 P	.04	.53	.19	.71	3.80	1.88	5.10	2.24	5.41	1.34	.52	0	21.76
Q	0	0	0	0	.19	.16	1.10	0	2.47	.73	0	0	4.65
1951 P	.36	1.60	1.16	3.12	3.50	9.40	6.32	3.42	3.39	2.03	.50	.13	34.93
Q	0	0	.04	.49	1.26	5.50	3.03	.12	.55	.01	0	0	11.00
1952 P	.22	.65	1.54	2.65	3.00	4.37	5.67	.95	.39	0	.80	1.10	21.34
Q	0	0	0	.10	.18	1.59	2.19	0	0	0	0	0	4.06
1953 P	.18	.76	.97	2.03	3.28	3.05	1.77	1.52	1.45	.72	2.65	1.36	19.74
Q	0	0	0	T	.27	.76	0	0	0	0	0	0	1.03
1954 P	.04	.30	.23	1.75	6.13	1.07	1.14	3.93	1.52	1.80	.01	.55	18.47
Q	0	0	0	.12	1.94	0	0	.09	0	T	0	0	2.15
AVG P	.29	.56	.91	2.38	3.60	4.62	3.29	2.61	2.45	1.24	.83	.52	23.30
Q	.02	.01	.05	.20	.62	1.25	.67	.27	.55	.21	.04	0	3.89

Notes: Station records began April 1941, part year amounts for 1941 not included in station averages.

MONTHLY PRECIPITATION AND RUNOFF (INCHES)						WATERSHED 20-H (44.24)							
YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR
1941 P				3.51	1.80	7.76	1.55	2.69	2.42	2.59	0.92	0.52	23.76
Q				.01	.01	1.87	0	.01	0	.09	.06	0	2.05
1942 P	0.02	0.56	1.78	3.50	2.57	7.94	1.79	4.33	6.04	.33	.08	.92	29.86
Q	.18	0	.04	.12	.01	3.34	T	1.12	3.00	0	0	0	7.81
1943 P	0	.67	.04	2.35	1.74	6.12	2.26	1.41	.06	.58	.12	.12	15.47
Q	0	T	0	.36	.15	1.90	0	0	0	0	0	0	2.41
1944 P	.86	.08	.82	4.29	5.64	3.87	1.74	7.67	.71	.72	1.47	.06	27.93
Q	0	0	.05	.63	2.34	.83	0	1.02	.01	T	0	0	4.88
1945 P	.26	.41	.55	3.09	3.78	3.57	3.75	1.10	2.53	.31	.04	.79	20.18
Q	0	0	0	.02	.15	.84	.77	T	.01	0	0	T	1.79
1946 P	.47	T	1.48	.21	2.78	2.88	3.33	3.96	5.84	3.97	1.83	T	26.75
Q	0	0	.02	0	0	.01	.09	.30	1.83	.67	.62	0	3.54
1947 P	.21	.12	.40	3.72	2.66	5.45	1.57	1.08	.33	.41	1.24	1.13	18.32
Q	0	0	0	.32	.23	1.99	.13	0	0	0	0	0	2.67
1948 P	.12	1.08	.47	.42	1.66	4.07	4.36	1.01	1.08	.73	1.21	.33	16.54
Q	0	0	.25	0	0	.50	.28	.01	0	0	0	0	1.04
1949 P	.78	.52	1.66	1.88	5.58	6.87	3.99	.97	1.71	3.17	0	.20	27.33
Q	0	0	.05	0	1.81	2.23	.79	0	0	.68	0	0	5.56
1950 P	.03	.42	.15	.62	3.90	2.02	4.92	2.27	5.30	1.33	.51	0	21.47
Q	0	0	0	0	.45	.29	1.17	0	1.93	.33	0	0	4.17
1951 P	.37	1.60	1.13	3.19	3.43	9.60	6.32	3.33	3.37	1.90	.50	.10	34.84
Q	0	0	T	.05	.14	4.29	3.06	.03	.30	.02	0	0	7.89
1952 P	.24	.47	1.39	2.58	2.91	4.20	5.31	.96	.38	0	.63	.65	19.72
Q	0	0	0	.17	.39	.58	1.62	0	0	0	0	0	2.76
1953 P	.12	.67	1.01	2.13	3.12	3.15	1.50	1.70	1.47	.81	2.55	1.36	19.59
Q	0	0	0	T	.09	.47	0	0	0	0	0	0	.56
1954 P	.04	.36	.34	1.85	6.17	1.21	1.11	3.86	1.55	1.94	.01	.50	18.94
Q	0	0	0	0	1.23	0	0	.06	0	.05	0	0	1.34
AVG P	.27	.54	.86	2.29	3.53	4.69	3.23	2.59	2.34	1.25	.78	.47	22.84
Q	.01	T	.03	.13	.54	1.33	.61	.20	.54	.13	.05	T	3.57

Notes: Station records began April 1941, part year amounts for 1941 not included in station averages.

MONTHLY PRECIPITATION AND RUNOFF (INCHES)

WATERSHED 21-H (44.25)

YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR
1941 P				3.51	1.80	7.76	1.55	2.69	2.42	2.59	0.92	0.52	23.76
Q				.15	.03	2.80	0	.07	.06	.57	.14	0	3.82
1942 P	0.02	0.56	1.78	3.50	2.57	7.94	1.79	4.33	6.04	.33	.08	.92	29.86
Q	.02	0	.06	.03	.05	2.00	T	.56	.34	0	0	0	3.06
1943 P	0	.67	.04	2.35	1.74	6.12	2.26	1.41	.06	.58	.12	.12	15.47
Q	.01	0	0	.04	T	1.17	T	0	0	0	0	0	1.22
1944 P	.86	.08	.82	4.29	5.64	3.87	1.74	7.67	.71	.72	1.47	.06	27.93
Q	0	0	T	.58	.98	.26	0	1.02	.02	T	T	0	2.86
1945 P	.26	.41	.55	3.09	3.78	3.57	3.75	1.10	2.53	.31	.04	.79	20.18
Q	0	0	0	.53	.84	1.30	.51	T	0	0	0	0	3.18
1946 P	.47	T	1.48	.21	2.78	2.88	3.33	3.96	5.84	3.97	1.83	T	26.75
Q	.02	0	0	0	0	.01	.16	.24	1.30	.53	.36	0	2.62
1947 P	.21	.12	.40	3.72	2.66	5.45	1.57	1.08	.33	.41	1.24	1.13	18.32
Q	0	0	0	.38	0	1.61	.02	0	0	0	0	0	2.01
1948 P	.12	1.08	.47	.42	1.66	4.07	4.36	1.01	1.08	.73	1.21	.33	16.54
Q	0	0	.30	0	0	.03	.74	0	0	0	0	0	1.07
1949 P	.78	.52	1.66	1.88	5.58	6.87	3.99	.97	1.71	3.17	0	.20	27.33
Q	0	0	0	0	3.02	3.03	1.23	0	0	1.20	0	0	8.48
1950 P	.03	.42	.15	.62	3.90	2.02	4.92	2.27	5.30	1.33	.51	0	21.47
Q	0	0	0	0	.01	.23	1.20	.04	2.29	.56	0	0	4.33
1951 P	.37	1.60	1.13	3.19	3.43	9.60	6.32	3.33	3.37	1.90	.50	.10	34.84
Q	0	.07	.04	.09	.45	4.78	3.11	.02	.02	T	0	0	8.58
1952 P	.24	.47	1.39	2.58	2.91	4.20	5.31	.96	.38	0	.63	.65	19.72
Q	0	0	0	.07	.44	.98	2.34	0	0	0	0	0	3.83
1953 P	.12	.67	1.01	2.13	3.12	3.15	1.50	1.70	1.47	.81	2.55	1.36	19.59
Q	0	0	0	0	.19	.91	0	0	0	0	0	0	1.10
1954 P	.04	.36	.34	1.85	6.17	1.21	1.11	3.86	1.55	1.94	.01	.50	18.94
Q	0	0	0	.07	2.26	0	0	T	0	.02	0	0	2.35
AVG P	.27	.54	.86	2.29	3.53	4.69	3.23	2.59	2.34	1.25	.78	.47	22.84
Q	T	.01	.03	.14	.63	1.25	.72	.14	.31	.18	.03	0	3.44

Notes: Station records began April 1941, part year amounts for 1941 not included in station averages.

MONTHLY PRECIPITATION AND RUNOFF (INCHES)													WATERSHED 22-H (44.26)@	
YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR	
1941 P				3.80	2.18	8.72	1.22	2.79	2.30	2.12	0.77	0.61	24.51	
Q				.10	.17	1.76	0	0	0	.01	0	0	2.04	
1942 P	0.02	0.46	1.70	3.44	2.81	8.65	2.39	4.37	6.64	.36	.15	1.03	32.02	
Q	.01	0	.01	.01	.06	2.23	.28	.48	.12	0	0	0	3.20	
1943 P	0	.77	.14	2.48	1.57	5.82	2.34	1.22	.11	1.27	.10	.14	15.96	
Q	0	0	0	.05	.02	1.14	.03	0	0	0	0	0	1.24	
1944 P	.80	.10	.83	4.18	5.65	3.21	1.83	7.69	.89	.88	1.53	.05	27.64	
Q	0	0	T	.20	.71	.08	0	1.03	.01	.01	T	0	2.04	
1945 P	.30	.36	.58	2.84	3.48	3.27	3.24	1.50	2.67	.30	.03	.92	19.49	
Q	0	0	0	.03	.46	.93	.21	T	0	0	0	0	1.63	
1946 P	.44	T	1.65	.19	2.65	2.45	3.54	3.85	5.21	3.96	1.94	.01	25.89	
Q	.01	0	0	0	0	.01	.20	.35	.86	.49	.26	0	2.18	
1947 P	.23	.15	.55	3.68	2.93	5.81	1.72	1.07	.35	.55	1.22	1.14	19.40	
Q	0	0	0	.32	.01	2.12	.03	0	0	0	0	0	2.48	
1948 P	.09	1.09	.45	.44	1.75	3.81	4.43	.81	1.03	.72	1.14	.26	16.02	
Q	0	0	.30	0	0	T	.68	0	0	0	0	0	.98	
1949 P	.83	.44	1.68	2.15	5.56	6.47	3.31	1.02	1.81	3.06	0	.19	26.52	
Q	0	0	0	0	2.50	2.66	.64	0	.01	1.05	0	0	6.86	
1950 P	T	.43	.24	.62	4.20	2.38	5.72	2.12	4.56	1.30	.51	0	22.08	
Q	0	0	0	0	.02	.43	1.36	.05	2.15	.68	0	0	4.69	
1951 P	0.35	1.61	1.03	2.99	3.62	10.29	5.63	3.24	3.41	1.69	.50	.10	34.46	
Q	0	.33	.05	.07	.66	5.51	3.04	.02	.01	0	0	0	9.69	
1952 P	.22	.56	1.43	2.38	2.78	4.74	6.01	1.62	.46	0	.76	.83	21.79	
Q	0	0	0	.01	.28	1.02	2.51	0	0	0	0	0	3.82	
1953 P	.16	.74	.96	1.96	2.81	3.17	1.21	1.79	1.39	.63	2.24	1.20	18.26	
Q	0	0	0	0	.03	.95	0	0	0	0	0	0	.98	
1954 P	.04	.27	.29	1.52	6.57	1.37	1.01	3.83	1.62	1.91	.01	.45	18.89	
Q	0	0	0	T	2.73	0	0	.01	.02	.04	0	0	2.80	
1962 P	NR	NR	NR	NR	NR	4.60	5.53	5.70	2.83	1.96	.17	.40		
Q	NR	NR	NR	NR	NR	.05	.42	1.18	.02	.08	.00	.00		
1963 P	.32	.00	1.52	1.07	.52	4.05	1.94	2.25	8.72	1.41	.29	.13	22.22	
Q	.00	.00	.00	.00	.00	.00	.00	.00	.22	T	.00	.00	.22	
1964 P	T	.47	1.38	1.10	.94	6.15	3.85	5.79	1.53	.08	.52	.00	21.18	
Q	.00	.00	.00	.00	.00	.02	.00	T	.00	.00	.00	.00	.02	
1965 P	1.01	1.37	1.57	2.08	11.40	8.17	5.06	1.76	4.53	.51	.14	.57	38.17	
Q	.00	.00	.00	.00	2.51	.27	.00	.00	.01	.00	.00	.00	2.79	
1966 P	.05	1.17	.43	.68	.76	3.11	4.20	1.76	1.49	.96	T	.22	14.83	
Q	.00	.21	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.21	
1967 P	.08	.14	.24	1.55	5.43	7.07	3.79	.43	4.55	1.21	.15	.49	25.13	
Q	.00	.00	.00	.00	.00	.07	.12	.00	.00	.00	.00	.00	.19	
AVG P	.25	.53	.85	1.08	3.31	5.52	4.08	2.91	3.96	1.04	.22	.30	24.05	
Q	.00	.04	.00	.00	.42	.07	.09	.20	.04	.02	.00	.00	.86	

Notes: Station records began April 1941, interrupted 1955 through May 1962, part year records not included in averages. Precipitation amounts are averages of amounts from individual gages for the years shown as follows: 1941 through 1954 gages are not documented; 1962 C-45-R, C-40; 1963 C-40; 1965 through 1967 C-40-R. 1964 through 1967 based on meteorological station records for January thru March, November and December.

MONTHLY PRECIPITATION AND RUNOFF (INCHES)													WATERSHED 23-H (44.27)@	
YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR	
1941 P				3.80	2.18	8.72	1.22	2.79	2.30	2.12	0.77	0.61	24.51	
Q				.22	.24	2.22	0	0	0	.01	T	0	2.69	
1942 P	0.02	0.46	1.70	3.44	2.81	8.65	2.39	4.37	6.64	.36	.15	1.03	32.02	
Q	0	0	.01	.03	0	5.31	T	1.55	3.00	0	0	0	9.90	
1943 P	0	.77	.14	2.48	1.57	5.82	2.34	1.22	.11	1.27	.10	.14	15.96	
Q	0	0	0	.23	.08	2.23	.05	0	0	.01	0	0	2.60	
1944 P	.80	.10	.83	4.18	5.65	3.21	1.83	7.69	.89	.88	1.53	.05	27.64	
Q	0	0	T	1.50	2.50	.55	0	.92	T	.02	.05	0	5.54	
1945 P	.30	.36	.58	2.84	3.48	3.27	3.24	1.50	2.67	.30	.03	.92	19.49	
Q	0	0	0	.02	.03	.77	.52	T	.01	0	0	T	1.35	
1946 P	.44	T	1.65	.19	2.65	2.45	3.54	3.85	5.21	3.96	1.94	.01	25.89	
Q	0	0	0	0	.01	0	.06	.30	.87	.33	.32	0	1.89	
1947 P	.23	.15	.55	3.68	2.93	5.81	1.72	1.07	.35	.55	1.22	1.14	19.40	
Q	0	0	0	.37	.50	2.28	.18	0	0	0	0	0	3.33	
1948 P	.09	1.09	.45	.44	1.75	3.81	4.43	.81	1.03	.72	1.14	.26	16.02	
Q	0	0	.25	0	0	.40	.96	T	.01	0	0	0	1.62	
1949 P	.83	.44	1.68	2.15	5.56	6.47	3.31	1.02	1.81	3.06	0	.19	26.52	
Q	0	0	.05	T	2.99	2.95	.51	0	0	.78	0	0	7.28	
1950 P	T	.43	.24	.62	4.20	2.38	5.72	2.12	4.56	1.30	.51	0	22.08	
Q	0	0	0	0	.78	.71	1.42	.04	1.92	.47	0	0	5.34	
1951 P	.35	1.61	1.03	2.99	3.62	10.29	5.63	3.24	3.41	1.69	.50	.10	34.46	
Q	0	0	.01	.04	.06	5.53	3.41	.25	.98	.12	0	0	10.40	
1952 P	.22	.56	1.43	2.38	2.78	4.74	6.01	1.62	.46	0	.76	.83	21.79	
Q	0	0	0	.08	.41	1.15	2.35	0	0	0	0	0	3.99	
1953 P	.16	.74	.96	1.96	2.81	3.17	1.21	1.79	1.39	.63	2.24	1.20	18.26	
Q	0	0	0	T	.16	.98	0	T	0	0	0	0	1.14	
1954 P	.04	.27	.29	1.52	6.57	1.37	1.01	3.83	1.62	1.91	.01	.45	18.89	
Q	0	0	0	0	1.93	0	0	.10	.04	.11	0	0	2.18	
1962 P	NR	NR	NR	NR	NR	4.60	5.53	5.70	2.83	1.96	.17	.40		
Q	NR	NR	NR	NR	NR	.11	.66	1.24	.02	.06	.00	.00		
1963 P	.32	.00	1.52	1.07	.52	4.05	1.94	2.25	8.72	1.41	.29	.13	22.22	
Q	.00	T	T	.00	.00	T	.00	.00	.23	.00	.00	.00	.23	
1964 P	T	.47	1.38	1.10	.94	6.15	3.85	5.79	1.53	.08	.52	.00	21.81	
Q	.00	.00	.00	.00	.00	T	T	T	T	.00	.00	.00	T	
1965 P	1.01	1.37	1.57	2.08	11.40	8.17	5.06	1.76	4.53	.51	.14	.57	38.17	
Q	.00	.00	.00	.00	2.51	.34	.00	.00	T	.00	.00	.00	2.85	
1966 P	.05	1.17	.43	.68	.76	3.11	4.20	1.76	1.49	.96	T	.22	14.83	
Q	.00	.21	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.21	
1967 P	.08	.14	.24	1.55	5.43	7.07	3.79	.43	4.55	1.21	.15	.49	25.13	
Q	.00	.00	.00	.00	.00	.07	.10	.00	.00	.00	.00	.00	.17	
AVG P	.25	.53	.85	1.08	3.31	5.52	4.08	2.91	3.96	1.04	.22	.30	24.05	
Q	.00	.04	.00	.00	.42	.09	.13	.21	.04	.01	.00	.00	.94	

Notes: Station records began April 1941, interrupted 1955 through May 1962, part year records not included in averages. Precipitation amounts are averages of amounts from individual gages for the years shown as follows: 1941 through 1954 gages are not documented; 1962 C-45-R (used for June), C-40 (used for July thru Oct.), Met. Sta. (used for Nov., Dec.); 1963 thru 1965, 1967 C-40-R (used for April 11 thru Nov. 20), Met. Sta. (used for Jan. 1 thru April 10 and Nov. 21 thru Dec. 31); 1967 D-45-R.

MONTHLY PRECIPITATION AND RUNOFF (INCHES)												WATERSHED 24-H (44.28) @	
YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR
1941 P				3.80	2.18	8.72	1.22	2.79	2.30	2.12	0.77	0.61	24.51
Q				.16	.24	2.48	0	.01	0	.06	T	0	2.95
1942 P	0.02	0.46	1.70	3.44	2.81	8.65	2.39	4.37	6.64	.36	.15	1.03	32.02
Q	.08	0	.03	.05	.03	2.00	.11	.61	1.74	0	0	0	5.64
1943 P	0	.77	.14	2.48	1.57	5.82	2.34	1.22	.11	1.27	.10	.14	15.96
Q	0	.05	0	.19	T	1.25	.01	0	0	0	0	0	1.50
1944 P	.80	.10	.83	4.18	5.65	3.21	1.83	7.69	.89	.88	1.53	.05	27.64
Q	0	0	T	.25	1.89	.37	0	.93	0	0	0	0	3.44
1945 P	.30	.36	.58	2.84	3.48	3.27	3.24	1.50	2.67	.30	.03	.92	19.49
Q	0	0	0	.04	.11	.49	.28	.02	.02	0	0	T	.96
1946 P	.44	T	1.65	.19	2.65	2.45	3.54	3.85	5.21	3.96	1.94	.01	25.89
Q	0	0	0	0	T	.02	.19	.56	1.07	.66	.37	0	2.87
1947 P	.23	.15	.55	3.68	2.93	5.81	1.72	1.07	.35	.55	1.22	1.14	19.40
Q	0	0	0	.56	.20	1.77	.02	0	0	0	0	0	2.55
1948 P	.09	1.09	.45	.44	1.75	3.81	4.43	.81	1.03	.72	1.14	.26	16.02
Q	0	0	.25	0	0	.01	.19	0	0	0	0	0	.45
1949 P	.83	.44	1.68	2.15	5.56	6.47	3.31	1.02	1.81	3.06	0	.19	26.52
Q	0	0	T	T	1.61	1.68	.69	0	.08	1.40	0	0	5.46
1950 P	T	.43	.24	.62	4.20	2.38	5.72	2.12	4.56	1.30	.51	0	22.08
Q	0	0	0	0	.10	.25	1.63	T	2.62	.71	0	0	5.31
1951 P	.35	1.61	1.03	2.99	3.62	10.29	5.63	3.24	3.41	1.69	.50	.10	34.46
Q	0	0	.10	.35	1.31	6.44	2.93	.06	.50	T	0	0	11.69
1952 P	.22	.56	1.43	2.38	2.78	4.74	6.01	1.62	.46	0	.76	.83	21.79
Q	0	0	0	.18	.04	1.86	2.78	0	0	0	0	0	4.86
1953 P	.16	.74	.96	1.96	2.81	3.17	1.21	1.79	1.39	.63	2.24	1.20	18.26
Q	0	0	0	0	.04	.40	T	.02	.03	T	T	0	.49
1954 P	.04	.27	.29	1.52	6.57	1.37	1.01	3.83	1.62	1.91	.01	.45	18.89
Q	0	0	0	.13	2.36	0	0	.07	.01	T	0	0	2.57
AVG P	.27	.54	.89	2.22	3.57	4.73	3.26	2.63	2.32	1.28	.78	.49	22.98
Q	.01	T	.03	.13	.59	1.27	.68	.17	.47	.21	.03	T	3.59

Notes: Station records began April 1941, part year amounts for 1941 not included in station averages.

MONTHLY PRECIPITATION AND RUNOFF (INCHES)												WATERSHED 25-H (44.29)	
1963 P					.51	4.25	2.16	2.21	8.27	1.46	.30	.13	19.29
Q					.00	.01	.00	.00	.00	.00	.00	.00	.01
1964 P	T	.47	1.38	1.20	.99	6.09	4.40	5.88	1.66	.10	.52	.00	22.69
Q	.00	.00	.00	.00	.00	.04	.01	.00	.00	.00	.00	.00	.05
1965 P	1.01	1.37	1.57	2.01	11.07	7.45	4.48	1.63	3.99	.46	.14	.57	35.75
Q	.00	.00	.03	.00	2.65	.52	.01	.00	.00	.00	.00	.00	3.21
1966 P	.05	1.17	.43	.59	.66	3.03	3.97	1.67	1.13	.78	T	.22	13.70
Q	.00	.00	.00	.00	.00	.01	.00	.00	.00	.00	.00	.00	.01
1967 P	.12	.15	.13	1.62	4.77	6.39	3.12	.33	4.37	1.17	.10	.50	22.77
Q	.00	.00	.00	.00	.00	.07	.10	.00	.00	.00	.00	.00	.17
AVG P	.24	.63	.70	1.08	3.60	5.44	3.63	2.34	3.88	.79	.21	.29	22.83
Q	.00	.00	.01	.00	.53	.13	.03	.00	.00	.00	.00	.00	.70

Notes: Station records began April 26, 1963. Precipitation obtained from rain gage B-36-R for 1963 thru 1967.

MONTHLY PRECIPITATION AND RUNOFF (INCHES)														WATERSHED 51-H	
YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR		
1940 P	.28	.37	.75	1.23	2.39	1.36	.34	.28	1.45	1.13	1.52	.49	11.59		
Q	.00	.172	T	.00	.264	.00	.00	.00	.156	.00	.003	.00	.595		
1941 P	.48	.39	.34	3.56	2.01	8.23	1.52	2.80	2.54	2.79	1.18	.92	26.76		
Q	.106	.00	.134	.020	.018	1.003	.00	.002	.00	.074	.00	.00	1.357		
1942 P	.04	.78	1.83	3.62	2.78	8.27	1.94	4.58	6.81	.34	.09	1.23	32.31		
Q	.00	.00	.012	.00	.00	.980	.00	.156	.359	.00	.00	.00	1.507		
1943 P	T	.68	.21	2.59	1.19	6.66	2.11	1.55	.04	.64	.10	.16	15.93		
Q	.00	.00	.00	.050	.007	1.029	.006	.00	.00	.00	.00	.00	1.092		
1944 P	.93	.26	1.59	5.14	5.60	3.67	1.62	7.74	.70	.82	1.69	.05	29.81		
Q	.00	.00	.004	.032	.485	.097	.00	.603	.003	.00	.00	.00	1.224		
1945 P	.37	.44	.55	3.22	3.74	3.53	3.74	1.25	2.57	.33	T	1.43	21.17		
Q	.00	.00	.00	.012	.146	.00	.00	.00	.018	.00	.00	.00	1.186		
1946 P	.56	T	1.64	.21	.44	2.80	3.44	3.69	5.78	4.10	2.15	.02	24.83		
Q	.00	.00	.00	.00	.00	.010	.00	.275	.312	.151	.00	.00	.748		
1947 P	.47	.22	.79	3.97	2.80	5.84	1.61	1.14	.37	.42	1.32	1.22	20.17		
Q	.00	.00	.00	.00	.099	.031	.693	.012	.00	.00	.00	.00	.835		
1948 P	.09	1.14	.51	.55	1.72	4.07	4.24	.98	1.08	.73	1.12	.35	16.58		
Q	.00	.00	.00	.00	.00	.021	.187	.002	.00	.00	.00	.00	.210		
1949 P	.74	.37	1.77	2.12	5.84	6.68	3.63	.97	1.73	3.01	.00	.18	27.04		
Q	.00	.00	.00	.009	.291	.432	.187	.00	.00	.166	.00	.00	1.085		
1950 P	.02	.59	.24	.75	3.90	2.03	5.37	2.21	4.98	1.32	.52	.00	21.93		
Q	.00	.00	.00	.00	.004	.009	.136	.004	.292	.050	.00	.00	.495		
1951 P	.38	1.63	1.23	3.22	3.48	9.83	6.09	3.30	3.32	1.66	.52	.14	34.80		
Q	.00	.010	T	.002	.006	2.308	1.079	.025	.039	.007	.00	.00	3.476		
1952 P	.19	.53	1.62	2.51	2.93	4.68	5.56	1.32	.40	.00	.73	.88	21.35		
Q	.00	.00	.00	.011	.173	.232	.968	.001	.00	.00	.00	.00	1.385		
1953 P	.06	.68	1.07	2.13	3.31	3.14	1.34	1.65	1.36	.65	2.25	1.26	18.90		
Q	.00	.00	.00	.014	.079	.372	.00	.009	.00	.00	.00	.00	.414		
1954 P	.04	.33	.26	1.68	6.01	1.11	.95	3.74	1.47	1.74	.01	.52	17.86		
Q	.00	.00	.00	.012	.859	.00	.00	.047	.005	.006	.00	.00	.929		
AVG P	.31	.56	.96	2.43	3.21	4.79	2.90	2.48	2.31	1.31	.88	.59	22.73		
Q	.007	.012	.010	.011	.162	.502	.217	.076	.079	.030	T	.00	1.106		

WATERSHED 52-H

1940 P	.28	.37	.75	1.23	2.39	1.36	.34	.28	1.45	1.13	1.52	.49	11.59		
Q	.00	.013	.00	.00	.007	.007	.00	.002	.004	.00	.002	.00	.035		
1941 P	.48	.39	.34	3.56	2.01	8.23	1.52	2.80	2.54	2.79	1.18	.92	26.76		
Q	.013	.00	.015	.005	.00	.041	.00	.005	.00	.011	.00	.00	.090		
1942 P	.04	.78	1.83	3.62	2.78	8.27	1.94	4.58	6.81	.34	.09	1.23	32.31		
Q	.00	.00	.001	.00	.00	.056	.00	.018	.039	.00	.00	.00	.114		
1943 P	T	.68	.21	2.59	1.19	6.66	2.11	1.55	.04	.64	.10	.16	15.93		
Q	.00	.00	.00	.006	.00	.069	.00	.00	.00	.00	.00	.00	.075		
1944 P	.93	.26	1.59	5.14	5.60	3.67	1.62	7.74	.70	.82	1.69	.05	29.81		
Q	.00	.00	.00	.036	.089	.028	.00	.139	.001	.00	.00	.00	.293		
1945 P	.37	.44	.55	3.22	3.74	3.53	3.74	1.25	2.57	.33	T	1.43	21.17		
Q	.00	.00	.00	T	.023	.167	.056	.00	.006	.00	.00	.001	.253		
1946 P	.56	T	1.64	.21	.44	2.80	3.44	3.69	5.78	4.10	2.15	.02	24.83		
Q	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR		
1947 P	.47	.22	.79	3.97	2.80	5.84	1.61	1.14	.37	.42	1.32	1.22	20.17		
Q	.00	.00	.00	.012	.006	.032	.004	.00	.00	.00	.00	.00	.054		
1948 P	.09	1.14	.51	.55	1.72	4.07	4.24	.98	1.08	.73	1.12	.35	16.58		
Q	.00	.00	.00	.00	.00	.00	.006	.001	.00	.00	.00	.00	.007		
1949 P	.74	.37	1.77	2.12	5.84	6.68	3.63	.97	1.73	3.01	.00	.18	27.04		
Q	.00	.00	.00	.002	.036	.073	.014	.00	.00	.032	.00	.00	.157		
1950 P	.02	.59	.24	.75	3.90	2.03	5.37	2.21	4.98	1.32	.52	.00	21.93		
Q	.00	.00	.00	.00	.004	.003	.027	.001	.117	.004	.00	.00	.156		
1951 P	.38	1.63	1.23	3.22	3.48	9.83	6.09	3.30	3.32	1.66	.52	.14	34.80		
Q	.00	.00	.00	.00	.005	.894	.625	.104	.006	.00	.00	.00	1.634		
1952 P	.19	.53	1.62	2.51	2.93	4.68	5.56	1.32	.40	.00	.73	.88	21.35		
Q	.00	.00	.00	.00	.018	.046	.407	.00	.00	.00	.00	.00	.471		
1953 P	.06	.68	1.07	2.13	3.31	3.14	1.34	1.65	1.36	.65	2.25	1.26	18.90		
Q	.00	.00	.00	.001	.002	.041	.00	T	.00	.00	.00	.00	.044		
1954 P	.04	.33	.26	1.68	6.01	1.11	.95	3.74	1.47	1.74	.01	.52	17.86		
Q	.00	.00	.00	.00	.197	.00	.00	.004	.00	.00	.00	.00	.201		
AVG P	.31	.56	.96	2.43	3.21	4.79	2.90	2.48	2.31	1.31	.88	.59	22.73		
Q	.001	.001	.001	.004	.028	.104	.081	.020	.012	.003	T	T	.255		

Notes: Precipitation amounts shown for Watersheds 51-H, 52-H, 53-H, and 54-H are those measured at the B-32-R gage. Periods of No Records (NR) are not included in averages.

MONTHLY PRECIPITATION AND RUNOFF (INCHES)													WATERSHED 53-H	
YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR	
1940 P	.28	.37	.75	1.23	2.39	1.36	.34	.28	1.45	1.13	1.52	.49	11.59	
Q	.00	.106	.011	.00	.006	.00	.00	.00	.002	.00	.00	.01	.126	
1941 P	.48	.39	.34	3.56	2.01	8.23	1.52	2.80	2.54	2.79	1.18	.92	26.76	
Q	.00	.00	.157	.001	.00	.010	.00	.001	.00	.003	.00	.00	.172	
1942 P	.04	.78	1.83	3.62	2.78	8.27	1.94	4.58	6.81	.34	.09	1.23	32.31	
Q	.00	.00	.00	.00	.00	.005	.00	.00	.003	.00	.00	.00	.008	
1943 P	. T	.68	.21	2.59	1.19	6.66	2.11	1.55	.04	.64	.10	.16	15.93	
Q	.00	.00	.00	.002	.00	.063	.00	.00	.00	.00	.00	.00	.065	
1944 P	.93	.26	1.59	5.14	5.60	3.67	1.62	7.74	.70	.82	1.69	.05	29.81	
Q	.00	.00	.00	.00	.007	.003	.00	.006	.00	.00	.00	.00	.016	
1945 P	.37	.44	.55	3.22	3.74	3.53	3.74	1.25	2.57	.33	T	1.43	21.17	
Q	.00	.00	.00	.00	.001	.019	.047	.00	.00	.00	.00	.00	.067	
1946 P	.56	T	1.64	.21	.44	2.80	3.44	3.69	5.78	4.10	2.15	.02	24.83	
Q	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
1947 P	.47	.22	.79	3.97	2.80	5.84	1.61	1.14	.37	.42	1.32	1.22	20.17	
Q	.00	.00	.00	.101	.002	.154	.001	.00	.00	.00	.00	.00	.258	
1948 P	.09	1.14	.51	.55	1.72	4.07	4.24	.98	1.08	.73	1.12	.35	16.58	
Q	.00	.00	.00	.00	.00	.005	.028	.002	.00	.00	.00	.00	.035	
1949 P	.74	.37	1.77	2.12	5.84	6.68	3.63	.97	1.73	3.01	.00	.18	27.04	
Q	.00	.00	.00	.003	.091	.247	.034	.00	.00	.029	.00	.00	.404	
1950 P	.02	.59	.24	.75	3.90	2.03	5.37	2.21	4.98	1.32	.52	.00	21.93	
Q	.00	.00	.00	.00	.002	.001	.056	.001	.289	.00	.00	.00	.349	
1951 P	.38	1.63	1.23	3.22	3.48	9.83	6.09	3.30	3.32	1.66	.52	.14	34.80	
Q	.00	.00	.00	T	.016	1.729	1.110	.004	.030	.001	.00	.00	2.890	
1952 P	.19	.53	1.62	2.51	2.93	4.68	5.56	1.32	.40	.00	.73	.88	21.35	
Q	.00	.00	.00	.00	.082	.096	.641	.00	.00	.00	.00	.00	.819	
1953 P	.06	.68	1.07	2.13	3.31	3.14	1.34	1.65	1.36	.65	2.25	1.26	18.90	
Q	.00	.00	.002	.002	.034	.115	.00	.00	.00	.00	.003	.00	.156	
1954 P	.04	.33	.26	1.68	6.01	1.11	.95	3.74	1.47	1.74	.01	.52	17.86	
Q	.00	.00	.00	.001	.415	.00	.00	.006	T	.006	.00	.00	.428	
AVG P	.31	.56	.96	2.43	3.21	4.79	2.90	2.48	2.31	1.31	.88	.59	22.73	
Q	.00	.008	.012	.008	.047	.175	.137	.001	.023	.003	T	T	.414	

WATERSHED 54-H													WATERSHED 54-H	
YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR	
1940 P	.28	.37	.75	1.23	2.39	1.36	.34	.28	1.45	1.13	1.52	.49	11.59	
Q	.00	.104	.00	.00	.235	.184	.00	.003	.038	.00	.00	.00	.564	
1941 P	.48	.39	.34	3.56	2.01	8.23	1.52	2.80	2.54	2.79	1.18	.92	26.76	
Q	.00	.00	.234	.007	.001	.395	.00	.008	.00	.018	.00	.00	.663	
1942 P	.04	.78	1.83	3.62	2.78	8.27	1.94	4.58	6.81	.34	.09	1.23	32.31	
Q	.00	.00	.00	.00	.00	.096	.00	.00	.202	.00	.00	.00	.298	
1943 P	T	.68	.21	2.59	1.19	6.66	2.11	1.55	.04	.64	.10	.16	15.93	
Q	.00	.00	.00	.065	.003	.831	.00	.00	.00	.00	.00	.00	.899	
1944 P	.93	.26	1.59	5.14	5.60	3.67	1.62	7.74	.70	.82	1.69	.05	29.81	
Q	.00	.00	.00	.00	.081	.014	.00	.054	.00	.00	.00	.00	.149	
1945 P	.37	.44	.55	3.22	3.74	3.53	3.74	1.25	2.57	.33	T	1.43	21.17	
Q	.00	.00	.00	.00	.00	.157	.051	.00	.00	.00	.00	.00	.208	
1946 P	.56	T	1.64	.21	.44	2.80	3.44	3.69	5.78	4.10	2.15	.02	24.83	
Q	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
1947 P	.47	.22	.79	3.97	2.80	5.84	1.61	1.14	.37	.42	1.32	1.22	20.17	
Q	.00	.00	.00	.034	T	.214	.00	.00	.00	.00	.00	.00	.248	
1948 P	.09	1.14	.51	.55	1.72	4.07	4.24	.98	1.08	.73	1.12	.35	16.58	
Q	.00	.00	.00	.00	.00	.094	.001	.00	.00	.00	.00	.00	.095	
1949 P	.74	.37	1.77	2.12	5.84	6.68	3.63	.97	1.73	3.01	.00	.18	27.04	
Q	.00	.00	.00	.005	.174	.339	.133	.00	.00	.093	.00	.00	.744	
1950 P	.02	.59	.24	.75	3.90	2.03	5.37	2.21	4.98	1.32	.52	.00	21.93	
Q	.00	.00	.00	.00	.002	.009	.069	.002	.311	.014	.00	.00	.407	
1951 P	.38	1.63	1.23	3.22	3.48	9.83	6.09	3.30	3.32	1.66	.52	.14	34.80	
Q	.00	.00	.00	.00	.041	1.812	1.209	.033	.020	.005	.00	.00	3.120	
1952 P	.19	.53	1.62	2.51	2.93	4.68	5.56	1.32	.40	.00	.73	.88	21.35	
Q	.00	.00	.00	.00	.296	.150	1.014	T	.00	.00	.00	.00	1.460	
1953 P	.06	.68	1.07	2.13	3.31	3.14	1.34	1.65	1.36	.65	2.25	1.26	18.90	
Q	.00	.00	.00	.004	.005	.379	.00	T	.00	.00	.00	.00	.388	
1954 P	.04	.33	.26	1.68	6.01	1.11	.95	3.74	1.47	1.74	.01	.52	17.86	
Q	.00	.00	.00	.005	.760	.00	.00	.041	.001	.019	.00	.00	.826	
AVG P	.31	.56	.96	2.43	3.21	4.79	2.90	2.48	2.31	1.31	.88	.59	22.73	
Q	.00	.007	.017	.009	.114	.334	.177	.010	.041	.011	.00	.00	.720	

Notes: Precipitation amounts shown for Watersheds 51-H, 52-H, 53-H, and 54-H are those measured at the B-32-R gage. Periods of No Records (NR) are not included in averages.

MONTHLY PRECIPITATION AND RUNOFF (INCHES)													WATERSHED 55-H	
YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR	
1940 P	.19	.20	.44	.97	2.27	1.36	.33	1.67	1.53	1.10	1.33	.38	11.77	
Q	.00	.072	.077	.00	.00	.006	.00	.001	.003	.00	T	.00	.159	
1941 P	.37	.34	.16	3.53	1.92	8.12	1.35	2.40	2.35	2.54	1.17	.65	24.90	
Q	.00	.00	.00	.00	.00	.033	.00	.00	.00	.00	.00	.00	.033	
1942 P	.08	.53	1.82	3.69	2.50	7.92	1.71	4.52	6.48	.32	.15	1.23	30.95	
Q	.00	.00	.00	.00	.00	.049	.00	.00	.005	.00	.00	.00	.054	
1943 P	T	.69	.11	2.31	1.20	6.42	2.03	1.55	.02	.57	.12	.14	15.16	
Q	.00	.00	.00	.00	.00	.035	.00	.00	.00	.00	.00	.00	.035	
1944 P	.94	.10	.75	4.09	5.73	3.66	2.00	7.25	.60	.78	1.37	.04	27.31	
Q	.00	.00	.00	.029	.031	.015	.00	.025	.00	.00	.00	.00	.100	
1945 P	.26	.34	.47	3.03	3.73	3.57	3.50	1.29	2.29	.32	T	.95	19.75	
Q	.00	.00	.00	.00	.00	.033	.006	.00	.00	.00	.00	.00	.039	
1946 P	.52	T	1.45	.24	.46	2.68	3.50	3.97	5.64	3.89	1.82	.00	24.17	
Q	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
1947 P	.21	.12	.37	3.56	2.66	5.50	1.65	1.04	.33	.42	1.11	1.02	17.99	
Q	.00	.00	.00	.011	.006	.019	.002	.00	.00	.00	.00	.00	.038	
1948 P	.05	1.11	.42	.50	1.67	3.92	3.96	.78	1.13	.69	1.16	.32	15.71	
Q	.00	.00	.00	.00	.00	.00	.004	.00	.00	.00	.00	.00	.004	
1949 P	.89	.41	1.59	2.09	5.78	6.21	2.71	1.05	1.64	3.10	.00	.17	25.64	
Q	.00	.00	.00	.001	.032	.127	.001	.00	.00	.020	.00	.00	.181	
1950 P	.01	.44	.23	.62	3.70	1.95	5.70	2.08	5.21	1.26	.49	.00	21.69	
Q	.00	.00	.00	.00	.041	.006	.074	.007	.147	.012	.00	.00	.287	
1951 P	.33	1.53	1.07	3.01	3.90	9.83	5.60	3.72	3.13	1.82	.48	.06	34.48	
Q	.00	.00	.00	.015	.030	.713	.187	.004	.010	.00	.00	.00	.959	
1952 P	.20	.42	1.31	2.50	2.99	4.75	5.75	1.55	.42	.00	.71	.84	21.44	
Q	.00	.00	.00	.003	.045	.033	.174	.00	.00	.00	.00	.00	.255	
1953 P	.10	.75	1.14	2.07	2.90	3.07	1.22	1.28	1.38	.62	2.51	1.17	18.21	
Q	.00	.00	.00	.00	.00	.016	.00	.00	.00	.00	.00	.00	.016	
1954 P	.04	.30	.26	1.63	6.10	1.05	1.00	4.17	1.46	1.67	.01	.47	18.16	
Q	.00	.00	.00	.003	1.077	.00	.00	.007	.00	.003	.00	.00	1.090	
AVG P	.28	.49	.77	2.26	3.17	4.67	2.80	2.55	2.24	1.27	.83	.50	21.83	
Q	.00	.005	.006	.004	.090	.078	.032	.003	.012	.003	.00	.00	.233	

WATERSHED 56-H														
YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR	
1940 P	.19	.20	.44	.97	2.27	1.36	.33	1.67	1.53	1.10	1.33	.38	11.77	
Q	.00	.062	.035	.00	.165	.115	.00	.007	.133	.00	.00	.00	.517	
1941 P	.37	.34	.16	3.53	1.92	8.12	1.35	2.40	2.35	2.54	1.17	.65	24.90	
Q	.047	.00	.067	.003	.003	1.027	.00	.002	.00	.184	.001	.00	1.334	
1942 P	.08	.53	1.82	3.69	2.50	7.92	1.71	4.52	6.48	.32	.15	1.23	30.95	
Q	.00	.00	.009	.00	.00	1.107	.00	.104	.297	.00	.00	.00	1.517	
1943 P	T	.69	.11	2.31	1.20	6.42	2.03	1.55	.02	.57	.12	.14	15.16	
Q	.00	.360	.00	.114	.021	1.247	.015	.00	.00	.00	.00	.00	1.757	
1944 P	.94	.10	.75	4.09	5.73	3.66	2.00	7.25	.60	.78	1.37	.04	27.31	
Q	.00	.00	.00	.022	1.220	.152	.00	.810	.00	.00	.00	.00	2.204	
1945 P	.26	.34	.47	3.03	3.73	3.57	3.50	1.29	2.29	.32	T	.95	19.75	
Q	.00	.00	.00	.014	.305	.964	.224	.00	.003	.00	.00	.00	1.510	
1946 P	.52	T	1.45	.24	.46	2.68	3.50	3.97	5.64	3.89	1.82	.00	24.17	
Q	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
1947 P	.21	.12	.37	3.56	2.66	5.50	1.65	1.04	.33	.42	1.11	1.02	17.99	
Q	.00	.00	.00	.369	.069	1.442	.040	.00	.00	.00	.00	.00	1.920	
1948 P	.05	1.11	.42	.50	1.67	3.92	3.96	.78	1.13	.69	1.16	.32	15.71	
Q	.00	.00	.00	.00	.00	.008	.072	.00	.00	.00	.00	.00	.080	
1949 P	.89	.41	1.59	2.09	5.78	6.21	2.71	1.05	1.64	3.10	.00	.17	25.64	
Q	.00	.00	.00	.009	1.097	1.037	.047	.00	.00	.543	.00	.00	2.733	
1950 P	.01	.44	.23	.62	3.70	1.95	5.70	2.08	5.21	1.26	.49	.00	21.69	
Q	.00	.00	.00	.00	.020	.019	.977	.010	1.311	.050	.00	.00	2.387	
1951 P	.33	1.53	1.07	3.01	3.90	9.83	5.60	3.72	3.13	1.82	.48	.06	34.48	
Q	.00	.00	.00	.036	.447	3.283	1.809	.058	.042	T	.00	.00	5.675	
1952 P	.20	.42	1.31	2.50	2.99	4.75	5.75	1.55	.42	.00	.71	.84	21.44	
Q	.00	.00	.00	.00	.363	.332	1.106	.00	.00	.00	.00	.00	1.801	
1953 P	.10	.75	1.14	2.07	2.90	3.07	1.22	1.28	1.38	.62	2.51	1.17	18.21	
Q	.00	.00	.00	.00	.042	.458	.00	.00	.00	.00	.00	.00	.500	
1954 P	.04	.30	.26	1.63	6.10	1.05	1.00	4.17	1.46	1.67	.01	.47	18.16	
Q	.00	.00	.00	.003	1.077	.00	.00	.007	.00	.003	.00	.00	1.090	
AVG P	.28	.49	.77	2.26	3.17	4.67	2.80	2.55	2.24	1.27	.83	.50	21.83	
Q	.003	.030	.008	.041	.345	.799	.306	.072	.128	.056	T	.00	1.788	

Notes: Precipitation amounts shown for Watersheds 55-H, 56-H, 57-H, and 58-H are those measured at the B-33-R gage. Periods of No Records (NR) are not included in averages.

MONTHLY PRECIPITATION AND RUNOFF (INCHES)

WATERSHED 57-H

YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR
1940 P	.19	.20	.44	.97	2.27	1.36	.33	1.67	1.53	1.10	1.33	.38	11.77
Q	.00	.058	.00	.00	.307	.275	.00	.045	.251	.00	.00	.00	.936
1941 P	.37	.34	.16	3.53	1.92	8.12	1.35	2.40	2.35	2.54	1.17	.65	24.90
Q	.00	.00	.012	.013	.037	1.594	.00	.00	.00	.078	.00	.00	1.734
1942 P	.08	.53	1.82	3.69	2.50	7.92	1.71	4.52	6.48	.32	.15	1.23	30.95
Q	.00	.00	.00	.00	.00	.585	.00	.020	.036	.00	.00	.00	.641
1943 P	T	.69	.11	2.31	1.20	6.42	2.03	1.55	.02	.57	.12	.14	15.16
Q	.00	.235	.00	.058	.005	.487	.00	.00	.00	.00	.00	.00	.785
1944 P	.94	.10	.75	4.09	5.73	3.66	2.00	7.25	.60	.78	1.37	.04	27.31
Q	.00	.00	.00	.015	.241	.066	.00	.178	.00	.00	.00	.00	.500
1945 P	.26	.34	.47	3.03	3.73	3.57	3.50	1.29	2.29	.32	T	.95	19.75
Q	.00	.00	.00	.00	.016	.393	.051	.00	.00	.00	.00	.00	.460
1946 P	.52	T	1.45	.24	.46	2.68	3.50	3.97	5.64	3.89	1.82	.00	24.17
Q	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1947 P	.21	.12	.37	3.56	2.66	5.50	1.65	1.04	.33	.42	1.11	1.02	17.99
Q	.00	.00	.00	.161	.016	.696	.007	.00	.00	.00	.00	.00	.880
1948 P	.05	1.11	.42	.50	1.67	3.92	3.96	.78	1.13	.69	1.16	.32	15.71
Q	.00	.00	.00	.00	.00	T	.002	.00	.00	.00	.00	.00	.002
1949 P	.89	.41	1.59	2.09	5.78	6.21	2.71	1.05	1.64	3.10	.00	.17	25.64
Q	.00	.00	.00	.00	.278	.466	.013	.00	.00	.245	.00	.00	1.002
1950 P	.01	.44	.23	.62	3.70	1.95	5.70	2.08	5.21	1.26	.49	.00	21.69
Q	.00	.00	.00	.00	.018	.003	.482	.005	.852	.034	.00	.00	1.394
1951 P	.33	1.53	1.07	3.01	3.90	9.83	5.60	3.72	3.13	1.82	.48	.06	34.48
Q	.00	.004	.00	.008	.228	2.535	1.177	.031	.005	.001	.00	.00	3.989
1952 P	.20	.42	1.31	2.50	2.99	4.75	5.75	1.55	.42	.00	.71	.84	21.44
Q	.00	.00	.00	.00	.279	.365	.883	.00	.00	.00	.00	.00	1.527
1953 P	.10	.75	1.14	2.07	2.90	3.07	1.22	1.28	1.38	.62	2.51	1.17	18.21
Q	.00	.00	.00	.00	.016	.314	.00	.00	.00	.00	.00	.00	.330
1954 P	.04	.30	.26	1.63	6.10	1.05	1.00	4.17	1.46	1.67	.01	.47	18.16
Q	.00	.00	.00	.00	.803	.00	.00	.013	.00	.001	.00	.00	.817
AVG P	.28	.49	.77	2.26	3.17	4.67	2.80	2.55	2.24	1.27	.83	.50	21.83
Q	.00	.021	.001	.018	.160	.556	.187	.021	.082	.026	.00	.00	1.072

WATERSHED 58-H

1940 P	.19	.20	.44	.97	2.27	1.36	.33	1.67	1.53	1.10	1.33	.38	11.77
Q	.00	.008	.00	.00	.005	.006	.00	.001	.002	.00	.00	.00	.022
1941 P	.37	.34	.16	3.53	1.92	8.12	1.35	2.40	2.35	2.54	1.17	.65	24.90
Q	.00	.00	.00	.00	.00	.091	.00	.002	.00	.021	.00	.00	.114
1942 P	.08	.53	1.82	3.69	2.50	7.92	1.71	4.52	6.48	.32	.15	1.23	30.95
Q	.00	.00	.001	.00	.00	.074	.00	.041	.162	.00	.00	.00	.278
1943 P	T	.69	.11	2.31	1.20	6.42	2.03	1.55	.02	.57	.12	.14	15.16
Q	.00	.00	.00	.00	.006	.053	.010	.00	.00	.00	.00	.00	.069
1944 P	.94	.10	.75	4.09	5.73	3.66	2.00	7.25	.60	.78	1.37	.04	27.31
Q	.00	.00	.005	.030	.098	.024	.00	.094	.001	.00	.00	.00	.252
1945 P	.26	.34	.47	3.03	3.73	3.57	3.50	1.29	2.29	.32	T	.95	19.75
Q	.00	.00	.00	.020	.034	.081	.017	.00	.002	.00	.00	.00	.154
1946 P	.52	T	1.45	.24	.46	2.68	3.50	3.97	5.64	3.89	1.82	.00	24.17
Q	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1947 P	.21	.12	.37	3.56	2.66	5.50	1.65	1.04	.33	.42	1.11	1.02	17.99
Q	.00	.00	.00	.014	.001	.030	.003	.00	.00	.00	.00	.00	.048
1948 P	.05	1.11	.42	.50	1.67	3.92	3.96	.78	1.13	.69	1.16	.32	15.71
Q	.00	.00	.00	.00	.00	.003	.005	.00	.00	.00	.00	.00	.008
1949 P	.89	.41	1.59	2.09	5.78	6.21	2.71	1.05	1.64	3.10	.00	.17	25.64
Q	.00	.00	.00	.001	.046	.099	.006	.00	.00	.043	.00	.00	.195
1950 P	.01	.44	.23	.62	3.70	1.95	5.70	2.08	5.21	1.26	.49	.00	21.69
Q	.00	.00	.00	.00	.010	.005	.057	.003	.140	.009	.00	.00	.224
1951 P	.33	1.53	1.07	3.01	3.90	9.83	5.60	3.72	3.13	1.82	.48	.06	34.48
Q	.00	.001	.00	.011	.034	.433	.198	.011	.004	.002	.00	.00	.694
1952 P	.20	.42	1.31	2.50	2.99	4.75	5.75	1.55	.42	.00	.71	.84	21.44
Q	.00	.00	.00	.003	.036	.060	.116	.00	.00	.00	.00	.00	.215
1953 P	.10	.75	1.14	2.07	2.90	3.07	1.22	1.28	1.38	.62	2.51	1.17	18.21
Q	.00	.00	.00	T	.015	.034	.00	.00	.00	.00	.00	.00	.049
1954 P	.04	.30	.26	1.63	6.10	1.05	1.00	4.17	1.46	1.67	.01	.47	18.16
Q	.00	.00	.00	.001	.114	.00	.00	.010	.00	.003	.00	.00	.128
AVG P	.28	.49	.77	2.26	3.17	4.67	2.80	2.55	2.24	1.27	.83	.50	21.83
Q	.00	.001	T	.006	.029	.071	.029	.012	.022	.006	.00	.00	.176

Notes: Precipitation amounts shown for Watersheds 55-H, 56-H, 57-H, and 58-H are those measured at the B-33-R gage. Periods of No Records (NR) are not included in averages.

ANNUAL MAXIMUM DISCHARGES IN INCHES PER HOUR AND ANNUAL MAXIMUM
VOLUMES OF RUNOFF IN INCHES FOR SELECTED TIME INTERVALS

WATERSHED W-3 (44.01)

YEAR	MAXIMUM DISCHARGE DATE	RATE	1 HOUR DATE	VOL	2 HOURS DATE	VOL	6 HOURS DATE	VOL	12 HOURS DATE	VOL	1 DAY DATE	VOL	2 DAYS DATE	VOL	8 DAYS DATE	VOL
1938	9-13	.13	9-13	.11	9-13	.16	8-16	.18	8-16	.18	8-16	.18	8-16	.18	8-16	.18
1939	6-20	1.15	6-20	.60	6-20	.75	6-20	.89	6-20	.90	6-20	.90	6-20	.92	6-15	1.13
1940	5-17	.05	5-17	.02	5-17	.04	5-17	.10	5-17	.10	5-17	.10	5-17	.10	5-17	.10
1941	6-5	1.19	6-5	.37	6-5	.53	6-5	.63	6-5	.68	6-5	.70	6-8	.84	6-2	1.60
1942	6-5	.20	6-20	.15	6-20	.15	6-20	.53	9-2	.59	9-2	.78	9-2	.78	6-20	1.30
1943	6-10	.35	6-10	.31	6-10	.47	6-10	.59	6-10	.59	6-10	.62	6-10	.77	6-7	1.27
1944	5-27	.47	5-12	.36	5-12	.53	5-12	.62	8-25	.78	8-25	.78	8-25	.78	8-23	1.15
1945	7-16	.17	6-5	.14	6-5	.26	6-5	.36	6-15	.43	6-15	.43	6-15	.43	6-5	.43
1946	9-5	.51	9-5	.42	9-5	.58	9-5	.73	9-5	.74	9-5	.83	9-5	1.23	9-5	1.36
1947	6-18	.30	6-12	.24	6-12	.39	6-12	.69	6-12	.71	6-12	.71	6-12	.71	6-12	1.11
1948	7-18	.30	7-18	.21	7-18	.30	7-18	.39	7-18	.39	7-18	.39	7-18	.39	7-18	.39
1949	5-5	.63	6-8	.90	6-8	.72	6-8	.90	6-8	1.13	6-8	1.14	6-7	1.45	6-5	1.83
1950	9-20	.57	9-19	.55	9-19	1.10	9-19	2.10	9-19	2.47	9-19	2.48	9-19	2.48	9-15	2.67
1951	7-10	1.74	7-10	1.32	6-1	1.73	6-1	2.35	6-1	2.52	7-10	2.66	7-10	2.67	7-10	3.32
1952	7-14	1.33	7-14	1.02	7-14	1.47	7-13	1.79	7-13	1.80	7-13	1.80	7-13	1.80	7-13	1.94
1953	6-7	.72	6-7	.58	6-7	.83	6-7	.88	6-7	.88	6-7	.88	6-7	.88	6-7	.88
1954	5-22	1.57	5-22	.92	5-22	1.29	5-22	1.39	5-22	1.48	5-22	1.49	5-22	1.49	5-15	1.59
1955	9-20	.13	9-20	.11	9-20	.19	9-20	.26	9-20	.27	9-20	.27	9-20	.32	9-20	.56
1956	6-26	.21	6-26	.19	6-26	.30	6-25	.38	6-25	.38	6-25	.38	6-25	.64	6-25	.96
1957	6-15	1.18	6-15	.64	6-15	1.07	6-15	2.28	6-15	3.12	6-15	3.52	6-15	4.69	6-10	4.80
1958	6-12	.18	6-12	.15	6-12	.24	6-12	.27	6-12	.28	6-12	.31	6-12	.32	3-29	.50
1959	7-3	2.00	7-3	1.32	7-3	1.67	7-3	1.80	7-3	1.80	7-3	1.80	7-3	1.80	6-28	2.35
1960	5-15	.93	5-15	.63	5-15	.81	5-15	.85	5-15	.85	3-26	.92	3-26	1.61	3-26	2.45
1961	6-15	.22	6-15	.20	6-15	.35	6-15	.52	6-15	.53	5-21	.80	5-20	1.05	5-17	1.21
1962	8-23	.27	8-23	.23	8-23	.35	8-23	.45	8-23	.52	8-23	.52	8-23	.52	7-11	.91
1963	9-9	.84	9-9	.55	9-9	.72	9-9	.76	9-9	.76	9-9	1.33	9-9	1.33	9-4	1.40
1964	8-17	.30	6-11	.24	6-11	.45	6-11	.72	6-11	.73	6-11	.73	6-11	.94	6-11	1.33
1965	5-22	1.82	5-21	1.21	5-21	1.74	5-21	2.49	5-21	4.43	5-21	4.82	5-21	4.82	5-21	5.55
1966	7-26	.40	7-26	.28	7-26	.37	7-26	.39	7-26	.39	7-26	.39	7-26	.39	7-26	.60
1967	9-19	.13	9-20	.10	9-19	.16	6-11	.27	6-11	.28	6-10	.39	6-9	.42	6-5	.48

WATERSHED W-5 (44.02)

1939	6-20	.16	6-20	.03	6-20	.13	6-20	.30	6-20	.32	6-20	.32	6-20	.34	6-20	.40
1940	6-8	.01	6-8	.01	6-8	.01	6-8	.02	6-8	.02	6-8	.02	6-8	.02	6-8	.02
1941	6-5	.25	6-5	.20	6-5	.28	6-8	.42	6-8	.61	6-8	.95	6-8	1.02	6-2	1.52
1942	6-5	.66	6-5	.42	6-5	.53	6-5	.59	6-20	.61	6-20	.61	6-20	.67	6-20	1.28
1943	6-10	.85	6-14	.60	6-14	.72	6-14	.76	6-14	.76	6-14	.76	6-10	1.07	6-10	1.83
1944	5-27	.80	5-12	.69	5-12	1.02	5-12	1.13	5-12	1.14	5-11	1.14	5-11	1.14	8-23	1.31
1945	7-16	.18	7-16	.15	7-16	.23	7-16	.37	7-16	.41	7-16	.41	7-16	.41	7-16	.41
1946	8-7	.23	8-7	.18	8-7	.28	8-7	.35	8-7	.36	8-7	.36	9-5	.57	9-5	.63
1947	6-12	.16	6-12	.15	6-12	.26	6-12	.47	6-11	.51	6-11	.52	6-11	.52	6-11	.84
1948	7-18	.27	7-18	.22	7-18	.36	7-18	.47	7-18	.48	7-18	.48	7-18	.48	7-18	.48
1949	6-8	.67	6-8	.59	6-8	.88	6-8	1.14	6-8	1.20	6-8	1.20	6-7	1.52	6-5	1.98
1950	9-19	.56	9-19	.50	9-19	.89	9-19	1.54	9-19	1.62	9-19	1.67	9-19	1.67	9-15	1.67
1951	6-1	.93	6-1	.89	6-1	1.56	6-1	2.06	6-1	2.28	6-1	2.30	7-10	2.40	6-1	2.69
1952	7-14	.64	7-14	.59	7-14	1.01	7-13	1.53	7-13	1.57	7-13	1.57	7-13	1.57	7-6	1.69
1953	6-7	.62	6-7	.47	6-7	.67	6-7	.80	6-7	.80	6-7	.80	6-7	.80	6-7	.80
1954	5-22	.68	5-22	.61	5-22	.83	5-22	1.02	5-22	1.04	5-22	1.06	5-22	1.06	5-15	1.11
1955	9-20	.15	9-20	.05	9-20	.08	9-20	.15	9-25	.18	9-25	.21	9-24	.21	9-20	.41
1956	6-26	.14	6-26	.12	6-26	.19	6-25	.24	6-25	.25	6-25	.25	6-25	.35	6-25	.56
1957	6-15	.92	6-15	.73	6-15	1.27	6-15	2.77	6-15	3.15	6-15	3.45	6-15	4.95	6-13	4.98
1958	6-12	.32	6-12	.22	6-12	.30	6-12	.34	6-12	.35	6-12	.37	6-12	.38	6-12	.38
1959	7-3	1.15	7-3	.93	7-3	1.20	7-3	1.34	7-3	1.36	7-3	1.36	7-3	1.36	6-27	1.80
1960	5-15	.64	5-15	.52	5-15	.69	5-15	.79	5-15	.80	5-15	.80	3-25	1.41	3-25	2.09
1961	6-15	.24	6-15	.23	6-15	.40	6-15	.64	6-15	.66	6-15	.67	6-15	.67	6-15	.67

WATERSHED W-8 (44.03)

1938	8-17	.02	8-17	.02	8-17	.03	8-17	.07	8-17	.10	8-17	.10	8-17	.10	8-17	.10
1939	6-20	.05	6-20	.04	6-20	.08	6-20	.18	6-20	.21	6-20	.22	6-20	.24	6-20	.25
1940	6-9	.01	6-9	.01	6-9	.01	6-9	.02	6-9	.03	6-9	.03	6-9	.04	6-8	.04
1941	6-22	.09	6-22	.07	6-22	.13	6-22	.27	6-8	.46	6-8	.73	6-8	.90	6-3	1.34
1942	6-5	.16	6-5	.13	6-5	.19	6-5	.45	6-20	.62	9-2	.78	9-2	.79	6-5	1.03
1943	6-14	.18	6-14	.15	6-14	.23	6-14	.50	6-14	.58	6-14	.60	6-10	.60	6-10	1.46
1944	8-25	.19	8-25	.18	8-25	.33	8-25	.73	8-25	1.10	8-25	1.18	8-25	1.19	8-23	1.64
1945	7-16	.17	7-16	.13	7-16	.23	7-16	.42	7-16	.58	7-16	.62	7-16	.63	7-16	.63
1946	9-6	.06	9-6	.06	9-6	.11	9-5	.26	9-5	.37	9-5	.43	9-5	.83	9-5	.84
1947	6-18	.08	6-18	.07	6-18	.12	6-12	.28	6-12	.40	6-12	.43	6-12	.43	6-12	.75
1948	7-18	.07	7-18	.06	7-18	.12	7-18	.23	7-18	.27	7-18	.28	7-18	.28	7-18	.28
1949	6-8	.19	6-8	.18	6-8	.32	6-8	.74	6-8	.98	6-8	1.00	6-7	1.05	6-5	1.69
1950	9-20	.27	9-20	.25	9-20	.47	9-20	.91	9-20	1.12	9-19	1.39	9-19	1.39	9-19	1.39
1951	6-1	.45	6-1	.40	6-1	.69	6-1	1.26	6-1	1.58	7-10	1.97	7-10	2.38	7-10	2.84
1952	7-14	.37	7-14	.33	7-14	.59	7-14	1.21	7-13	1.43	7-13	1.46	7-13	1.46	7-13	1.61
1953	6-7	.26	6-7	.23	6-7	.42	6-7	.79	6-7	.85	6-7	.86	6-7	.86	6-7	.87
1954	5-22	.38	5-22	.33	5-22	.59	5-22	1.00	5-22	1.10	5-22	1.17	5-22	1.17	5-18	1.59
1955	9-20	.06	9-20	.06	9-20	.11	9-20	.27	9-20	.33	9-20	.33	9-20	.40	9-20	.68
1956	6-26	.07	6-26	.07	6-26	.12	6-26	.27	6-25	.30	6-24	.31	6-25	.43	6-25	.85
1957	6-15	.38	6-15	.37	6-15	.70	6-15	1.67	6-15	2.58	6-15	3.43	6-15	4.86	6-13	4.99
1958	6-12	.14	6-12	.12	6-12	.20	6-12	.32	6-12	.38	6-12	.40	6-12	.42	6-12	.44
1959	7-3	.51	7-3	.42	7-3	.71	7-3	1.17	7-3	1.27	7-3	1.27	7-3	1.28	6-28	1.84
1960	5-15	.27	5-15	.22	5-15	.41	5-15	.71	3-27	.83	3-26	1.28	3-26	1.48	3-26	2.36
1961	6-15	.10	6-15	.099	5-22	.17	5-22	.44	5-21	.57	5-21	.80	5-21	.98	5-16	1.04
1962	8-23	.13	8-23	.11	8-23	.17	8-23	.57	8-23	.61	8-23	.61	8-23	.61	8-23	.78
1963	9-9	.16	9-9	.15	9-9	.25	9-9	.51	9-9	.62	9-9	1.13	9-9	1.16	9-4	1.19
1964	6-11	.14	6-11	.12	6-11	.23	6-11	.54	6-11	.60	6-11	.60	6-11	.60	6-11	.60
1965	5-22	.52	5-22	.42	5-22	.72	5-22	1.43	5-22	2.01	5-22	2.01	5-22	2.01	5-21	3.54

ANNUAL MAXIMUM DISCHARGES IN INCHES PER HOUR AND ANNUAL MAXIMUM
VOLUMES OF RUNOFF IN INCHES FOR SELECTED TIME INTERVALS

WATERSHED W-11 (44.04)

YEAR	MAXIMUM DISCHARGE		1 HOUR		2 HOURS		6 HOURS		12 HOURS		1 DAY		2 DAYS		8 DAYS	
	DATE	RATE	DATE	VOL	DATE	VOL	DATE	VOL	DATE	VOL	DATE	VOL	DATE	VOL	DATE	VOL
1939	6-21	.01	6-21	.01	6-21	.02	6-21	.05	6-21	.07	6-20	.08	6-20	.10	6-20	.12
1940	6-22	T	6-22	T	6-22	T	6-22	T	6-22	T	6-22	T	6-22	T	6-22	T
1941	6-9	.04	6-8	.02	6-8	.05	6-8	.17	6-8	.33	6-8	.56	6-8	.81	6-2	1.03
1942	9-3	.05	6-20	.03	6-20	.05	6-20	.14	6-20	.41	6-20	.55	9-2	.57	6-20	1.21
1943	6-14	.08	6-14	.08	6-14	.15	6-14	.32	6-14	.52	6-14	.57	6-14	.57	6-10	1.48
1944	5-12	.11	5-12	.10	5-12	.18	8-25	.46	8-25	.79	8-25	1.05	8-25	1.06	8-23	1.74
1945	7-16	.09	7-16	.09	7-16	.17	7-16	.35	7-16	.56	7-16	.66	7-16	.67	7-16	.67
1946	9-6	.02	9-6	.02	9-6	.04	9-6	.12	9-6	.29	9-6	.31	9-5	.67	9-5	.75
1947	6-12	.04	6-12	.03	6-12	.07	6-12	.19	6-12	.28	4-10	.31	4-9	.32	6-12	.58
1948	7-18	.02	7-18	.02	7-18	.04	7-18	.10	7-9	.14	7-9	.17	7-9	.17	7-9	.17
1949	6-9	.11	6-9	.08	6-9	.20	6-8	.48	6-8	.72	6-8	.86	6-8	.86	6-5	1.57
1950	9-20	.21	9-20	.19	9-20	.38	9-20	.80	9-19	1.13	9-19	1.33	9-19	1.35	9-19	1.35
1951	6-1	.33	6-1	.31	6-1	.59	6-1	1.16	6-1	1.49	7-10	1.83	7-10	2.23	7-10	2.61
1952	7-14	.30	7-14	.22	7-14	.45	7-14	.83	7-14	1.14	7-13	1.17	7-13	1.28	7-13	1.39
1953	6-7	.19	6-7	.16	6-7	.30	6-7	.67	6-7	.83	6-7	.84	6-7	.85	6-7	.85
1954	5-23	.28	5-23	.26	5-23	.47	5-22	.80	5-22	.98	5-22	1.07	5-22	1.08	5-22	1.41
1955	9-20	.05	9-20	.04	9-20	.09	9-20	.24	9-20	.41	9-20	.43	9-20	.53	9-20	.90
1956	7-3	.03	6-26	.02	6-26	.04	6-26	.12	6-26	.16	7-3	.23	7-2	.24	6-26	.63
1957	6-15	.41	6-15	.40	6-15	.78	6-15	1.83	6-15	2.72	6-15	3.27	6-15	4.87	6-13	4.93
1958	8-16	.03	8-16	.03	8-16	.06	8-16	.16	8-16	.26	8-16	.33	8-16	.33	3-26	.33
1959	7-3	.24	7-3	.22	7-3	.40	7-3	.84	7-3	1.19	7-3	1.25	7-3	1.25	6-27	1.84
1960	5-15	.23	5-15	.22	5-15	.42	5-15	.84	5-15	1.02	5-15	1.03	3-26	1.28	3-26	2.11
1961	6-15	.10	6-15	.10	6-15	.20	6-15	.55	6-15	.89	6-15	.92	6-15	.93	6-15	.93
1962	9-15	.07	8-23	.06	8-23	.12	8-23	.35	8-23	.58	8-23	.70	8-23	.70	8-23	.78
1963	9-10	.04	9-9	.04	9-9	.09	9-9	.23	9-9	.43	9-9	.61	9-9	.64	9-4	.66
1964	6-12	.05	6-11	.05	6-11	.10	6-11	.27	6-11	.40	6-11	.42	6-11	.52	6-11	.72
1965	5-22	.42	5-22	.38	5-22	.78	5-22	1.43	5-22	2.26	5-22	2.72	5-21	2.79	5-21	3.47
1966	7-27	.01	7-27	.01	7-27	.03	7-27	.07	7-26	.11	7-26	.13	7-26	.13	7-26	.24
1967	6-10	.04	6-10	.04	6-10	.07	6-10	.16	6-11	.27	6-10	.36	6-10	.56	6-5	.72

WATERSHED 1-H (44.05)

1939	8-11	.38	8-11	.05	8-11	.05	8-11	.05	8-11	.05	8-11	.05	8-11	.05	8-11	.05
1940	5-17	.03	5-17	.01	5-17	.01	5-17	.01	5-17	.01	5-17	.01	5-17	.01	5-17	.01
1941	6-5	.05	3-9	.04	3-9	.07	3-9	.15	3-9	.17	3-9	.17	3-9	.20	3-2	.21
1942	9-7	.05	9-7	T	9-7	T	9-7	T	9-7	T	9-7	T	9-7	T	9-7	T
1943	6-14	.06	6-14	.01	6-14	.01	6-14	.01	2-2	.01	2-2	.01	2-2	.01	6-10	.02
1944	6-17	.02	5-12	T	4-23	T	4-23	.01	4-23	.01	4-22	.01	4-22	.01	3-8	.01
1945	6-5	.09	6-5	.01	6-5	.01	7-16	.01	7-16	.01	7-16	.01	4-6	.01	4-6	.01
1946	8-7	.19	8-7	.02	8-7	.02	8-7	.02	8-7	.02	8-7	.02	8-7	.02	8-7	.02
1947	6-17	.01	6-17	T	6-17	T	6-17	T	6-17	T	6-17	T	6-17	T	6-17	T
1948	7-9	.01	7-9	T	7-9	T	7-9	T	7-9	T	7-9	T	7-9	T	7-9	T
1949	10-9	.39	10-9	.13	10-9	.13	10-9	.13	10-9	.13	10-9	.13	10-9	.13	10-9	.13
1950	9-15	.11	9-15	.03	9-15	.03	9-19	.04	9-19	.05	9-19	.05	9-19	.05	9-15	.08
1951	7-10	1.16	6-1	.69	6-1	.89	6-1	.92	6-1	.92	6-1	.92	6-1	.92	6-1	.92
1952	6-26	.63	7-14	.14	7-14	.15	7-14	.15	7-14	.15	7-14	.15	7-14	.15	7-14	.15
1953	6-7	.01	6-7	T	6-7	T	6-7	T	6-7	T	6-7	T	6-7	T	6-7	T
1954	5-22	.66	5-22	.14	5-22	.14	5-22	.14	5-22	.14	5-22	.14	5-22	.14	5-22	.14
1955	9-20	.44	9-20	.09	9-20	.09	9-20	.09	9-20	.09	9-20	.09	9-20	.09	9-20	.09
1956	2-23	T	2-23	T	2-23	T	2-23	T	2-23	T	2-23	T	2-23	T	2-23	T
1957	6-16	1.35	6-16	.32	6-15	.47	6-15	.60	6-15	.60	6-15	.60	6-15	.96	6-10	1.13
1958	6-12	.68	6-12	.14	6-12	.14	6-12	.14	6-12	.14	6-12	.14	6-12	.14	6-12	.14
1959	7-3	.90	7-3	.42	7-3	.42	7-3	.42	7-3	.42	7-3	.42	7-3	.42	7-3	.42
1960	5-15	.97	5-15	.38	5-15	.38	5-15	.38	5-15	.38	5-15	.38	5-15	.38	3-26	.39
1961	8-11	.44	8-11	.10	8-11	.10	8-11	.10	8-11	.10	8-11	.10	8-11	.10	8-11	.10
1962	3-20	.04	3-20	.04	3-20	.06	3-20	.09	3-20	.10	3-20	.11	3-20	.12	3-20	.14
1963	3-15	.16	3-15	.13	3-15	.19	3-15	.21	3-15	.21	3-15	.21	3-15	.21	3-10	.22
1964	7-26	1.49	7-27	.32	7-27	.33	7-27	.33	3-27	.33	8-20	.54	8-20	.54	8-17	.90
1965	6-12	2.35	5-21	1.35	5-21	1.78	5-21	2.00	5-21	3.69	5-21	3.69	5-21	3.69	5-21	4.27
1966	7-29	.78	7-29	.17	7-29	.18	7-29	.18	7-29	.18	7-29	.18	7-29	.18	7-26	.27
1967	7-8	1.76	7-8	.34	6-11	.35	6-11	.35	6-11	.35	6-10	.62	6-10	.62	6-7	.65

WATERSHED 2-H (44.06)

1939	8-11	1.11	8-11	.16	8-11	.16	8-11	.16	8-11	.16	8-11	.16	8-11	.16	8-11	.16
1940	5-17	.01	6-8	T	6-8	T	5-17	T	5-17	T	5-17	T	5-17	T	5-17	T
1941	6-5	.80	6-5	.21	6-5	.22	6-5	.22	6-5	.22	6-5	.22	6-5	.22	6-2	.40
1942	9-7	1.39	9-7	.25	9-7	.25	9-7	.25	9-7	.25	9-7	.25	9-7	.25	9-2	.26
1943	6-14	.12	2-3	.09	2-2	.14	2-2	.21	2-2	.23	2-2	.23	2-2	.23	2-2	.23
1944	5-27	.57	8-25	.12	8-25	.12	8-25	.13	8-25	.13	8-25	.13	8-25	.13	8-25	.22
1945	7-16	.61	7-16	.11	7-16	.11	7-16	.11	7-16	.11	7-16	.11	7-16	.11	7-16	.11
1946	8-7	1.48	9-5	.24	9-5	.24	9-5	.24	9-5	.24	9-5	.24	9-5	.24	9-5	.24
1947	6-17	.04	4-9	.04	4-9	.04	4-9	.04	4-9	.04	4-9	.04	4-9	.04	4-9	.04
1948	7-18	.94	7-18	.18	7-18	.18	7-18	.18	7-18	.18	7-18	.18	7-18	.18	7-18	.18
1949	6-8	.49	6-8	.23	6-8	.26	6-8	.26	6-8	.26	6-8	.26	6-8	.26	6-8	.26
1950	6-16	.07	9-19	.02	9-19	.03	9-19	.05	9-19	.05	9-19	.05	9-19	.05	9-19	.05
1951	7-10	1.89	6-1	.67	6-1	.88	6-1	.91	6-1	.91	6-1	.91	6-1	.91	6-1	.91
1952	7-14	1.86	7-14	.54	7-14	.58	7-14	.58	7-14	.58	7-14	.58	7-14	.58	7-14	.58
1953	6-7	.16	6-7	.05	6-7	.05	6-7	.05	6-7	.05	6-7	.05	6-7	.05	6-7	.05
1954	5-22	1.89	5-22	.44	5-22	.46	5-22	.46	5-22	.46	5-22	.46	5-22	.46	5-22	.46
1958	6-12	.85	6-12	.18	6-12	.18	6-12	.18	6-12	.18	6-12	.18	6-12	.18	6-22	.18
1959	7-3	2.52	7-3	1.38	7-3	1.41	7-3	1.41	7-3	1.41	7-3	1.41	7-3	1.41	6-27	1.49
1960	5-15	1.55	5-15	.58	5-15	.59	5-15	.59	5-15	.59	5-15	.59	3-26	.73	3-26	1.05
1961	8-11	.61	8-11	.16	8-11	.16	8-11	.16	8-11	.16	8-11	.16	8-11	.16	8-11	.16
1962	8-23	1.23	8-23	.43	8-23	.43	8-23	.43	8-23	.43	8-23	.43	8-23	.43	8-23	.43
1963	9-9	.16	3-15	.12	3-15	.13	3-15	.23	3-15	.23	3-15	.23	3-15	.23	3-10	.25
1964	6-21	.46	6-21	.11	6-21	.11	6-21	.11	6-21	.11	6-21	.11	6-21	.11	6-21	.11
1965	6-12	3.47	5-21	2.38	5-21	2.40	5-21	2.58	5-21	5.30	5-21	5.30	5-21	5.30	5-21	5.48

ANNUAL MAXIMUM DISCHARGES IN INCHES PER HOUR AND ANNUAL MAXIMUM
VOLUMES OF RUNOFF IN INCHES FOR SELECTED TIME INTERVALS

WATERSHED 3-H (44.07)

YEAR	MAXIMUM DISCHARGE DATE RATE	1 HOUR DATE VOL	2 HOURS DATE VOL	6 HOURS DATE VOL	12 HOURS DATE VOL	1 DAY DATE VOL	2 DAYS DATE VOL	8 DAYS DATE VOL
1939	8-11 3.64	8-11 .53	8-11 .53	6-20 .56	6-20 .56	6-20 .56	6-20 .66	6-15 .93
1940	6-8 .16	6-8 .03	3-16 .05	3-16 .11	3-16 .16	3-16 .19	3-15 .29	3-9 .31
1941	6-8 3.94	6-5 .81	6-5 .96	6-5 1.00	6-5 1.00	6-5 1.14	6-8 1.47	6-2 3.01
1942	8-7 2.69	6-5 .93	6-5 .93	6-5 .93	6-5 .93	6-5 .93	6-5 .93	6-20 1.62
1943	6-10 3.41	6-10 .81	6-10 .81	6-10 .81	6-10 .81	6-10 1.05	6-10 1.16	6-7 1.97
1944	8-29 3.44	8-25 .72	8-25 1.21	8-25 1.94	8-25 1.97	8-25 1.98	8-25 1.98	8-23 2.90
1945	6-5 3.50	6-5 .77	6-5 .77	6-5 .77	6-5 .77	6-5 .78	6-5 .79	6-5 .79
1946	8-7 5.42	8-7 .91	8-7 .91	9-5 1.15	9-5 1.15	9-5 1.24	9-5 1.72	9-5 1.84
1947	6-12 1.90	6-12 .68	6-12 .84	6-12 1.11	6-11 1.13	6-11 1.13	6-11 1.13	6-11 1.81
1948	7-8 3.84	7-18 .77	7-18 .77	7-18 .77	7-18 .77	7-18 .77	7-18 .77	7-18 .77
1949	5-5 4.12	5-5 1.08	5-5 1.23	6-8 1.46	6-8 1.46	6-8 1.46	6-6 1.98	6-5 2.79
1950	7-17 3.36	9-19 .71	9-19 1.09	9-19 2.20	9-19 2.47	9-19 2.47	9-19 2.47	9-15 2.56
1951	7-10 5.50	7-10 2.23	7-10 2.30	6-1 3.36	6-1 3.74	6-1 3.74	6-1 3.74	6-1 4.31
1952	6-26 5.50	7-14 1.76	7-14 2.12	7-13 2.50	7-13 2.50	7-13 2.50	7-12 2.53	7-12 2.66
1953	6-7 4.17	6-7 1.25	6-7 1.39	6-7 1.39	6-7 1.39	6-7 1.39	6-7 1.39	6-7 1.47
1954	5-22 4.37	5-22 1.28	5-22 1.74	5-22 1.76	5-22 1.76	5-22 1.87	5-22 1.87	5-15 2.27
1958	7-18 1.56	7-18 .44	7-18 .45	8-16 .49	8-16 .49	8-16 .49	7-17 .65	7-17 .83
1959	7-3 6.45	7-3 2.34	7-3 2.35	7-3 2.35	7-3 2.35	7-3 2.35	7-3 2.35	6-28 3.44
1960	9-28 5.71	5-15 1.47	5-15 1.50	5-15 1.53	5-15 1.55	5-15 1.56	3-26 1.84	3-26 4.08
1961	8-11 1.66	8-11 .34	6-15 .58	6-15 .65	6-15 .65	6-15 .66	5-21 1.13	5-17 1.35
1962	8-23 1.99	8-23 .83	8-23 .84	8-23 .91	8-23 .93	8-23 .93	8-23 .93	8-23 1.18
1963	9-9 3.15	9-10 .69	9-10 .84	9-10 .88	9-9 1.50	9-9 1.54	9-9 1.54	9-9 1.75
1964	6-21 3.31	6-21 .44	6-21 .44	8-20 .55	8-20 .55	8-20 .55	8-20 .55	6-11 .71
1965	5-21 2.77	5-21 1.65	5-21 2.22	5-21 2.64	5-21 4.48	5-21 4.80	5-21 4.80	5-21 5.38
1966	7-29 2.82	7-29 .44	7-29 .45	7-29 .45	7-29 .45	7-29 .45	7-29 .45	7-26 .75
1967	7-8 2.27	7-8 .58	7-8 .62	7-8 .62	7-8 .62	6-10 .82	6-10 .82	6-5 1.03

Notes: No maximum discharges or flow volumes for 1955-57.

WATERSHED 4-H (44.08)

1939	8-11 1.78	6-20 .33	6-20 .33	6-20 .45	6-20 .45	6-20 .45	6-20 .50	6-15 .65
1940	6-8 1.55	6-8 .28	6-8 .33	6-8 .33	6-8 .33	6-8 .33	6-8 .33	6-8 .33
1941	6-5 1.19	6-5 .56	6-5 .66	6-5 .68	6-5 .68	6-5 .73	6-8 .89	6-2 1.79
1942	8-7 2.50	8-7 .71	8-7 .71	8-7 .71	8-7 .71	8-7 .71	8-5 .85	6-20 1.62
1943	6-14 2.38	6-14 .76	6-14 .77	6-14 .77	6-14 .77	6-10 .89	6-10 1.00	6-7 1.80
1944	5-27 3.95	5-27 .92	5-27 .93	5-27 .93	5-27 .93	5-27 .93	5-27 .94	5-25 1.18
1945	6-5 2.32	6-5 .45	6-5 .45	7-16 .60	7-16 .60	7-16 .60	7-16 .60	7-11 .60
1946	8-7 5.01	8-7 .87	8-7 .87	9-5 1.00	9-5 1.00	9-5 1.04	9-5 1.40	9-5 1.48
1947	6-22 .94	6-17 .38	4-9 .43	6-12 .59	6-11 .61	6-11 .61	6-11 .61	6-11 1.01
1948	7-18 2.44	7-18 .53	7-18 .53	7-18 .53	7-18 .53	7-18 .53	7-18 .53	7-18 .53
1949	10-10 2.56	10-9 .70	6-8 .88	6-8 1.08	10-9 1.23	10-9 1.23	10-9 1.23	4-30 1.60
1950	9-19 2.35	9-19 .74	9-19 1.22	9-19 2.35	9-19 2.40	9-19 2.40	9-19 2.40	9-15 2.40
1951	7-10 5.19	7-10 1.68	6-1 1.78	6-1 3.19	6-1 3.19	6-1 3.19	6-1 3.19	6-1 3.65
1952	6-26 7.67	7-14 1.34	6-26 1.70	7-13 1.99	7-13 1.99	7-13 1.99	7-13 1.99	7-6 2.40
1953	6-7 1.35	6-7 .68	6-7 .77	6-7 .77	6-7 .77	6-7 .77	6-7 .77	6-5 .77
1954	5-22 3.95	5-22 1.06	5-22 1.50	5-22 1.52	5-22 1.52	5-22 1.52	5-22 1.52	5-15 1.95
1958	7-18 1.25	7-18 .22	7-18 .23	7-18 .23	7-18 .23	7-18 .23	7-17 .27	7-17 .38
1959	7-3 4.50	7-3 2.15	7-3 2.15	7-3 2.15	7-3 2.15	7-3 2.15	7-3 2.15	6-28 2.88
1960	6-14 6.19	5-15 1.56	5-15 1.59	5-15 1.60	5-15 1.60	5-15 1.60	5-15 1.60	3-26 3.75
1961	8-11 3.17	8-11 .52	6-15 .72	6-15 .82	6-15 .83	5-21 1.20	5-20 1.61	5-17 1.75
1962	8-23 5.48	8-23 1.03	8-23 1.30	8-23 1.50	8-23 1.51	8-23 1.51	8-23 1.51	7-11 2.00
1963	9-9 2.02	9-9 .59	9-9 .61	9-9 .61	9-9 1.04	9-9 1.07	9-9 1.07	9-4 1.08
1964	6-21 4.55	6-21 .71	6-11 1.37	6-11 1.37	6-11 1.37	6-11 1.37	6-11 1.71	6-11 2.32
1965	6-12 3.82	5-21 1.84	5-21 2.57	5-21 3.17	5-21 5.94	5-21 6.37	5-21 6.37	5-21 7.21
1966	7-29 1.08	7-29 .21	7-29 .21	7-29 .21	7-29 .21	7-29 .21	7-29 .21	7-26 .32
1967	7-8 2.54	7-8 .71	7-8 .99	7-8 1.09	7-8 1.09	7-8 1.09	7-8 1.09	7-8 1.09

Notes: No maximum discharges or flow volumes for 1955-57.

WATERSHED 5-H (44.09)

1939	8-11 .71	6-20 .30	6-20 .30	6-20 .37	6-20 .37	6-20 .37	6-20 .41	6-15 .51
1940	6-8 .03	6-8 .01	6-8 .01	3-15 .02	3-16 .03	3-16 .03	3-15 .06	3-15 .06
1941	6-5 .82	6-5 .42	6-5 .54	6-5 .56	6-5 .58	6-8 .92	6-8 1.02	6-2 1.64
1942	8-7 2.35	8-7 .72	8-7 .72	8-7 .72	8-7 .72	8-7 .72	8-5 .79	6-20 1.37
1943	6-10 2.30	6-10 .66	6-10 .67	6-10 .67	6-10 .77	6-10 .77	6-10 .83	6-7 1.44
1944	8-29 1.66	8-25 .57	8-25 .79	8-25 1.24	8-25 1.26	8-25 1.26	8-25 1.26	8-25 1.79
1945	6-5 2.27	6-5 .70	6-5 .70	6-5 .70	6-5 .70	6-5 .70	6-5 .70	6-5 .70
1946	9-5 .96	9-5 .51	9-5 .52	9-5 .61	9-5 .61	9-5 .64	9-5 .83	9-5 .87
1947	6-26 1.03	6-12 .32	6-12 .40	9-5 .64	6-11 .66	6-11 .66	6-11 .66	6-11 .89
1948	7-18 1.56	7-18 .49	7-18 .49	7-18 .49	7-18 .49	7-18 .49	7-18 .49	7-18 .49
1949	5-5 2.13	5-5 .76	5-5 .90	6-8 1.17	6-8 1.17	6-8 1.17	6-6 1.57	6-5 2.24
1950	7-23 1.94	9-19 .53	9-19 1.00	9-19 1.71	9-19 1.89	9-19 1.89	9-19 1.89	9-15 1.94
1951	7-10 3.10	7-10 1.48	6-1 1.59	6-1 2.58	6-1 2.76	6-1 2.76	6-1 2.76	6-1 3.14
1952	7-14 2.94	7-14 1.41	7-14 1.78	7-13 2.01	7-13 2.01	7-13 2.01	7-12 2.02	7-13 2.07
1953	6-7 1.22	6-7 .53	6-7 .61	6-7 .62	6-7 .62	6-7 .62	6-7 .62	6-7 .62
1954	5-22 2.78	5-22 1.07	5-22 1.08	5-22 1.52	5-22 1.56	5-22 1.56	5-22 1.56	6-15 1.75
1955	6-3 .76	6-4 .18	9-20 .29	9-20 .38	9-20 .38	9-20 .38	9-20 .44	9-20 .68
1956	6-26 .98	6-26 .30	6-26 .36	6-25 .42	6-25 .42	6-25 .42	6-25 .66	6-25 .66
1958	7-18 1.43	7-18 .30	7-18 .30	7-18 .30	7-18 .30	7-18 .30	7-17 .34	7-17 .49
1959	7-3 3.50	7-3 1.75	7-3 1.77	7-3 1.77	7-3 1.77	7-3 1.77	7-3 1.77	6-28 2.20
1960	6-14 4.24	5-15 1.02	5-15 1.06	5-15 1.06	5-15 1.06	5-15 1.06	5-15 1.06	3-26 2.46
1961	8-11 2.77	8-11 .47	6-15 .63	6-15 .73	6-15 .73	6-15 .73	5-20 1.03	5-17 1.17
1962	8-23 .69	8-23 .29	8-23 .30	8-23 .33	8-23 .34	8-23 .34	8-23 .34	8-23 .41
1963	9-9 1.98	9-9 .61	9-9 .66	9-9 .66	9-9 1.15	9-9 1.16	9-9 1.16	9-4 1.19
1964	8-20 2.45	8-17 .62	8-17 .80	8-17 .80	8-17 .80	7-26 1.08	7-26 1.08	8-16 1.78
1965	5-21 3.24	5-21 1.60	5-21 2.26	5-21 2.78	5-21 5.41	5-21 5.77	5-21 5.77	5-21 6.37
1966	7-29 .64	7-29 .16	7-29 .16	2-8 .26	2-8 .27	2-8 .27	2-8 .27	2-8 .27
1967	9-19 1.64	7-8 .36	7-8 .37	7-8 .37	7-8 .37	6-10 .42	6-10 .42	9-19 .66

Notes: No maximum discharges or flow volumes for 1955-57.

ANNUAL MAXIMUM DISCHARGES IN INCHES PER HOUR AND ANNUAL MAXIMUM
VOLUMES OF RUNOFF IN INCHES FOR SELECTED TIME INTERVALS

WATERSHED 6-H (44.10)

YEAR	MAXIMUM		1 HOUR		2 HOURS		6 HOURS		12 HOURS		1 DAY		2 DAYS		8 DAYS	
	DISCHARGE DATE	RATE	DATE	VOL	DATE	VOL	DATE	VOL	DATE	VOL	DATE	VOL	DATE	VOL	DATE	VOL
1939	6-20	1.50	6-20	.59	6-20	.60	6-20	.67	6-20	.67	6-20	.67	6-20	.69	6-12	.95
1940	5-17	.61	5-17	.21	5-17	.22	5-17	.25	5-17	.25	5-17	.25	5-17	.25	5-17	.25
1941	6-5	1.01	6-5	.47	6-5	.57	6-5	.58	6-5	.59	6-5	.62	6-8	.66	6-2	1.41
1942	8-7	2.28	8-7	.67	8-7	.68	6-20	.76	6-20	.76	6-20	.76	6-20	.84	6-20	1.45
1943	6-10	1.64	6-14	.59	6-14	.64	6-14	.64	6-14	.64	6-10	.68	6-10	.76	6-7	1.41
1944	5-27	3.19	5-27	.75	5-11	.85	5-11	.85	5-11	.89	5-11	.89	5-11	.69	5-20	.98
1945	7-16	1.95	7-16	.54	7-16	.54	7-16	.78	7-16	.78	7-16	.78	7-16	.78	7-16	.78
1946	9-5	3.74	9-5	1.11	9-5	1.12	9-5	1.30	9-5	1.30	9-5	1.40	9-5	1.92	9-5	1.93
1947	6-26	1.23	6-17	.38	6-12	.42	6-12	.55	6-11	.58	6-11	.58	6-11	.58	6-11	.98
1948	7-18	2.57	7-18	.57	7-18	.58	7-18	.58	7-18	.58	7-18	.58	7-18	.58	7-18	.58
1949	5-5	2.28	5-5	.84	5-5	.90	6-8	1.25	6-8	1.26	6-8	1.26	6-6	1.72	6-5	2.40
1950	6-16	2.34	9-19	.66	9-19	1.03	9-19	1.79	9-19	1.98	9-19	1.98	9-19	1.98	9-15	2.03
1951	7-10	4.79	7-10	1.66	6-1	2.09	6-1	2.64	6-1	2.80	7-10	2.85	7-10	2.85	7-10	3.53
1952	6-26	2.93	7-14	1.26	7-14	1.58	7-13	1.71	7-13	1.71	7-13	1.71	7-12	1.72	7-7	1.75
1953	6-7	1.78	6-7	.88	6-7	.99	6-7	1.00	6-7	1.00	6-7	1.00	6-7	1.00	6-5	1.01
1954	5-22	5.70	5-22	1.54	5-22	1.79	5-22	1.80	5-22	1.87	5-22	1.87	5-22	1.87	5-22	1.88
1955	6-3	1.46	6-4	.25	9-20	.37	9-20	.48	9-20	.48	9-20	.48	9-20	.56	9-20	.88
1956	6-27	1.48	6-26	.35	6-25	.36	6-25	.45	6-25	.45	6-25	.45	6-25	.80	6-25	.97
1958	7-18	1.48	7-18	.29	7-18	.30	7-18	.30	7-18	.30	7-18	.30	7-17	.36	7-17	.50
1959	7-3	3.24	7-3	1.65	7-3	1.66	7-3	1.66	7-3	1.66	7-3	1.66	7-3	1.66	6-28	2.06
1960	6-14	3.61	5-15	1.07	5-15	1.15	5-15	1.19	5-15	1.19	5-15	1.19	5-15	1.19	3-26	2.55
1961	8-11	2.19	8-11	.43	6-15	.72	6-15	.80	6-15	.81	6-15	.81	5-20	1.01	5-17	1.15
1962	6-22	.60	8-23	.20	8-23	.21	8-23	.25	8-23	.28	8-23	.28	8-23	.28	8-23	.32
1963	9-9	2.02	9-9	.59	9-9	.61	9-9	.61	9-9	1.03	9-9	1.07	9-9	1.07	9-4	1.10
1964	7-27	2.59	7-27	.87	7-27	.94	7-27	.94	7-26	1.32	7-26	1.37	7-26	1.37	8-16	1.78
1965	5-22	3.65	5-21	1.60	5-21	2.26	5-21	2.78	5-21	5.41	5-21	5.77	5-21	5.77	5-21	6.37
1966	7-29	.72	7-29	.12	2-8	.14	2-8	.23	2-8	.23	2-8	.23	2-8	.23	2-8	.23
1967	9-19	1.87	9-19	.37	9-19	.37	9-19	.45	9-19	.45	9-19	.51	9-19	.51	9-19	.76

Notes: No maximum discharges or flow volumes for 1957.

WATERSHED 7-H (44.11)

1939	6-20	1.61	6-20	.57	6-20	.57	6-20	.63	6-20	.63	6-20	.63	6-20	.64	6-12	.85
1940	5-17	.83	5-17	.26	5-17	.26	5-17	.30	5-17	.30	5-17	.30	5-17	.30	5-17	.30
1941	6-5	.71	6-5	.37	6-5	.43	6-5	.44	6-5	.44	6-5	.47	6-5	.47	6-2	1.04
1942	8-7	1.88	8-7	.55	8-7	.55	6-20	.75	6-20	.75	6-20	.75	6-20	.83	6-20	1.23
1943	6-10	1.64	6-10	.51	6-10	.52	6-14	.53	6-14	.53	6-10	.59	6-10	.64	6-7	1.18
1944	5-27	3.25	5-27	.74	5-11	.86	5-11	.86	5-11	.88	5-11	.88	5-11	.88	5-25	.94
1945	7-16	1.81	7-16	.49	7-16	.49	7-16	.63	7-16	.63	7-16	.63	7-16	.63	7-16	.63
1946	9-5	3.66	9-5	1.05	9-5	1.06	9-5	1.20	9-5	1.20	9-5	1.28	9-5	1.82	9-5	1.86
1947	6-12	.58	6-17	.21	6-12	.24	6-12	.33	6-12	.33	6-12	.33	6-12	.33	6-12	.54
1948	7-18	1.27	7-18	.25	7-18	.25	7-18	.25	7-18	.25	7-18	.25	7-18	.25	7-18	.25
1949	5-5	2.15	5-5	.72	6-8	.98	6-8	1.30	6-8	1.30	6-8	1.31	6-6	1.83	6-5	2.51
1950	6-16	1.83	9-19	.73	9-19	1.08	9-19	1.58	9-19	1.66	9-19	1.74	9-19	1.74	9-15	1.80
1951	7-10	2.61	7-10	1.00	6-1	1.58	6-1	1.80	6-1	1.92	6-1	1.92	7-10	2.25	7-10	2.30
1952	5-21	2.37	7-13	1.18	7-14	1.46	7-13	1.56	7-13	1.56	7-13	1.56	7-13	1.56	7-13	1.60
1953	6-6	1.57	6-7	.82	6-7	.89	6-7	.89	6-7	.89	6-7	.89	6-7	.89	6-5	.90
1954	5-22	4.76	5-22	1.39	5-22	1.52	5-22	1.53	5-22	1.58	5-22	1.58	5-22	1.58	5-22	1.59
1955	6-3	1.66	9-20	.34	9-20	.54	9-20	.63	9-20	.63	9-20	.63	9-20	.63	9-20	1.22
1956	6-27	1.14	6-27	.34	6-27	.40	6-27	.41	6-27	.41	6-27	.41	6-25	.74	6-25	.88
1958	7-18	.78	7-18	.23	7-18	.26	7-18	.29	7-18	.29	7-18	.29	7-17	.33	7-17	.49
1959	7-3	2.56	7-3	2.04	7-3	2.06	7-3	2.06	7-3	2.06	7-3	2.06	7-3	2.06	6-28	2.50
1960	5-16	3.63	5-15	1.19	5-15	1.29	5-15	1.40	5-15	1.48	5-15	1.49	5-15	1.49	3-26	3.42
1961	6-15	.72	6-15	.39	6-15	.72	6-15	.81	6-15	.81	6-15	.83	5-20	1.14	5-17	1.24
1962	8-23	2.96	8-23	.85	8-23	.85	8-23	.96	8-23	.96	8-23	.96	8-23	.96	8-23	1.30
1963	9-9	.60	9-9	.38	9-9	.38	9-9	.60	9-9	.60	9-9	.60	9-9	.60	9-4	.60
1964	6-21	2.44	7-27	.60	7-27	.63	7-27	.67	7-26	.75	7-26	.79	7-26	.79	8-16	1.16
1965	5-22	3.65	5-22	1.68	5-22	1.77	5-22	3.13	5-21	4.76	5-21	5.06	5-21	5.06	5-21	5.35
1966	6-8	.19	6-8	.03	6-8	.03	6-8	.03	6-8	.03	6-8	.03	6-8	.03	6-8	.03
1967	7-8	2.22	7-8	.66	7-8	.77	7-8	.83	7-8	.83	7-8	.83	7-8	.83	7-8	.63

Notes: No maximum discharges or flow volumes for 1957.

WATERSHED 8-H (44.12)

1939	8-11	2.67	6-20	.50	6-20	.50	6-20	.62	6-20	.62	6-20	.62	6-20	.65	6-15	.96
1940	2-11	.01	2-11	.01	2-11	.02	2-11	.02	2-11	.02	2-11	.02	2-11	.02	2-11	.03
1941	6-5	.92	6-5	.51	6-5	.61	6-5	.61	6-5	.61	6-5	.64	6-8	.67	6-2	1.47
1942	8-7	1.39	8-7	.48	8-7	.48	8-7	.48	8-7	.48	8-5	.49	8-5	.49	8-5	.49
1943	6-10	3.66	6-14	.93	6-14	.94	6-14	.94	6-14	.94	6-10	1.08	6-10	1.22	6-7	2.16
1944	5-27	2.13	5-27	.72	5-11	.82	5-11	.82	5-11	.82	5-11	.84	5-11	.84	5-20	.90
1945	6-5	.78	7-16	.20	7-16	.20	7-16	.25	7-16	.25	7-16	.25	7-16	.25	7-16	.25
1946	8-7	.34	9-5	.08	9-5	.08	9-5	.09	9-5	.09	9-5	.09	9-5	.10	9-5	.11
1947	6-17	.20	6-17	.11	6-17	.12	6-17	.12	6-12	.13	6-12	.13	6-12	.13	6-12	.24
1948	7-18	.66	7-18	.24	7-18	.24	7-18	.24	7-18	.24	7-18	.24	7-18	.24	7-18	.24
1949	5-5	.84	5-5	.34	5-5	.37	5-20	.38	5-20	.38	5-20	.38	5-20	.38	5-18	.48
1950	9-19	1.73	9-19	.70	9-19	1.14	9-19	1.88	9-19	1.90	9-19	1.90	9-19	1.90	9-15	1.92
1951	7-10	2.65	7-10	1.47	6-1	1.66	6-1	2.35	6-1	2.46	6-1	2.46	6-1	2.46	6-1	2.78
1952	7-14	2.88	7-14	1.08	7-14	1.28	7-13	1.40	7-13	1.40	7-13	1.40	7-13	1.40	7-12	1.42
1953	6-7	1.03	6-7	.61	6-7	.70	6-7	.71	6-7	.71	6-7	.71	6-7	.71	6-7	.71
1954	5-22	2.15	5-22	.99	5-22	1.40	5-22	1.42	5-22	1.42	5-22	1.42	5-22	1.42	5-18	1.48
1958	7-18	.39	7-18	.21	7-18	.21	7-18	.21	7-18	.21	7-18	.21	7-17	.23	7-17	.24
1959	7-3	3.42	7-3	1.67	7-3	1.70	7-3	1.70	7-3	1.70	7-3	1.70	7-3	1.70	6-28	2.33
1960	9-28	3.35	5-15	.82	5-15	.85	5-15	.85	5-15	.85	5-15	.85	5-15	.85	5-15	1.23
1961	6-15	.49	6-15	.31	6-15	.56	5-22	.72	5-22	.72	5-21	.85	5-20	.95	5-17	.97
1962	8-23	.40	8-23	.19	8-23	.22	7-16	.27	7-16	.27	7-16	.27	7-16	.29	7-11	.34
1963	9-9	.60	9-9	.38	9-9	.38	9-9	.60	9-9	.60	9-9	.60	9-9	.60	9-4	.60
1964	7-27	.71	7-27	.34	8-20	.38	8-20	.40	8-20	.40	8-20	.40	8-20	.40	8-17	.57
1965	5-21	1.81	5-21	1.22	5-22	1.85	5-22	2.23	5-21	4.19	5-21	4.35	5-21	4.35	5-21	4.68
1966	7-29	.60	7-29	.16	7-29	.16	7-29	.16	7-29	.16	7-29	.16	7-29	.16	7-26	.24
1967	6-11	.45	6-11	.10	6-11	.19	7-8	.20	7-8	.20	7-8	.20	7-8	.20	7-8	.20

YEAR	MAXIMUM		1 HOUR		2 HOURS		6 HOURS		12 HOURS		1 DAY		2 DAYS		8 DAYS		
	DATE	RATE	DATE	VOL	DATE	VOL	DATE	VOL	DATE	VOL	DATE	VOL	DATE	VOL	DATE	VOL	
1939	8-11	1.87	6-20	.23	6-20	.23	6-20	.34	6-20	.34	6-20	.34	6-20	.41	6-20		.50
1940	5-17	.04	5-17	.01	5-17	.02	5-17	.02	5-17	.02	5-17	.02	3-15	.02	3-9		.03
1941	6-5	.94	6-5	.39	6-5	.45	6-5	.45	6-5	.46	6-5	.48	6-8	.53	6-2		1.03
1942	8-7	2.04	6-5	.56	6-5	.58	6-5	.58	9-2	.75	9-2	.75	9-2	.89	6-20		1.48
1943	6-10	1.75	6-10	.49	6-10	.49	6-10	.49	6-10	.61	6-10	.90	6-10	1.13	6-7		1.62
1944	5-27	2.83	5-27	.75	5-27	.76	5-27	.76	5-27	.76	5-27	.76	5-27	.76	5-20		.89
1945	7-16	2.81	7-16	.38	7-16	.38	7-16	.64	7-16	.64	7-16	.64	7-16	.64	7-16		.64
1946	9-5	2.54	9-5	.60	9-5	.60	9-5	.63	9-5	.66	9-5	.66	9-5	1.05	9-5		1.07
1947	6-17	.66	6-17	.25	6-17	.26	6-12	.33	6-11	.33	6-11	.33	6-11	.33	6-11		.56
1948	7-18	2.27	7-18	.36	7-18	.36	7-18	.36	7-18	.36	7-18	.36	7-18	.36	7-18		.36
1949	5-5	1.93	5-5	.67	6-8	.84	6-8	1.14	6-8	1.14	6-8	1.15	6-6	1.52	6-5		2.12
1950	7-17	1.53	7-17	.33	7-17	.34	9-19	1.10	9-19	1.90	9-19	1.90	9-19	1.90	9-19		1.90
1951	7-10	4.36	7-10	1.29	6-1	1.50	6-1	1.85	6-1	1.99	7-10	2.03	7-10	2.44	7-10		2.49
1952	7-14	2.24	7-14	1.05	7-14	1.26	7-13	1.34	7-13	1.34	7-13	1.34	7-13	1.34	7-13		1.38
1953	6-7	1.73	6-7	.89	6-7	.97	6-7	.98	6-7	.98	6-7	.98	6-7	.98	6-5		.98
1954	5-22	5.20	5-22	1.26	5-22	1.56	5-22	1.56	5-22	1.64	5-22	1.64	5-22	1.64	5-22		1.74

1939	8-11	.54	8-11	.03	8-11	.03	6-20	.03	6-20	.03	6-20	.03	6-20	.04	6-20	.04
1940	6-8	.05	6-8	.02	6-8	.02	6-8	.02	6-8	.02	6-8	.02	6-8	.02	6-8	.02
1941	6-5	.29	6-5	.11	6-5	.12	6-5	.12	6-5	.13	6-5	.13	6-5	.13	6-2	.25
1942	8-7	2.69	6-20	.69	6-20	.71	6-20	.94	6-20	.94	9-2	.96	6-20	1.06	6-20	1.84
1943	6-10	1.71	6-10	.60	6-14	.62	6-14	.62	6-14	.62	6-10	.73	6-10	.84	6-7	1.46
1944	5-27	2.33	5-12	.56	5-12	.66	5-11	.67	5-11	.70	5-11	.70	5-11	.70	5-11	.71
1945	6-5	1.89	7-16	.48	7-16	.48	7-16	.61	6-15	.75	6-15	.75	6-15	.75	6-15	.75
1946	9-5	1.46	9-5	.51	9-7	.52	9-7	.64	9-7	.65	9-6	.75	9-5	1.26	9-5	1.34
1947	6-17	.96	6-17	.42	6-12	.44	6-12	.60	6-11	.61	6-11	.61	6-11	.61	6-11	1.42
1948	6-26	.37	6-26	.11	6-26	.12	6-26	.12	6-26	.12	6-26	.12	6-26	.12	6-21	.14
1949	6-8	1.69	6-8	.63	6-8	.81	6-8	1.11	6-8	1.11	6-8	1.12	6-6	1.50	6-5	2.11
1950	9-19	1.05	9-19	.51	9-19	.86	9-19	1.43	9-19	1.49	9-19	1.49	9-19	1.49	9-15	1.99
1951	7-10	3.89	7-10	1.29	7-10	1.42	6-1	1.73	6-1	1.87	6-1	1.87	7-10	2.28	7-10	2.48
1952	7-14	2.62	7-14	1.39	7-14	1.78	7-13	2.10	7-13	2.10	7-13	2.10	7-13	2.10	7-13	2.14
1953	6-7	.98	6-7	.62	6-7	.69	6-7	.69	6-7	.69	6-7	.69	6-7	.69	6-7	.69
1954	5-22	3.71	5-22	1.12	5-22	1.26	5-22	1.29	5-22	1.43	5-22	1.43	5-22	1.43	5-22	1.49

1939	8-11	.50	6-20	.06	6-20	.06	6-20	.09	6-20	.09	6-20	.09	6-20	.11	6-15	.12
1940	6-8	.52	6-8	.14	6-8	.14	6-8	.14	6-8	.14	6-8	.14	6-8	.14	6-8	.14
1941	6-8	2.01	6-5	.58	6-5	.63	6-5	.63	6-8	.67	6-8	1.11	6-8	1.24	6-5	1.98
1942	8-7	1.98	8-7	.47	8-7	.47	8-7	.47	8-7	.47	8-7	.47	8-5	.52	6-16	.78
1943	6-10	2.68	6-10	.74	6-10	.76	6-10	.76	6-10	.89	6-10	.97	6-10	1.13	6-7	1.83
1944	5-12	1.98	5-27	.60	5-11	.75	8-25	.95	8-25	.95	8-25	.95	8-25	.95	8-25	1.46
1945	6-5	2.76	6-5	.60	6-5	.60	6-5	.60	6-15	.60	6-15	.60	6-15	.60	6-15	.60
1946	8-7	3.61	8-7	.76	9-5	.76	9-5	.98	9-5	.98	9-5	1.05	9-5	1.50	9-5	1.59
1947	6-7	.92	6-12	.41	6-12	.53	6-12	.76	6-12	.77	6-12	.77	6-12	.77	6-12	1.18
1948	7-18	1.98	7-18	.45	7-18	.45	7-18	.45	7-18	.45	7-18	.45	7-18	.45	7-18	.45
1949	10-10	2.81	10-9	.91	6-8	1.02	6-8	1.45	10-9	1.48	10-9	1.48	6-6	1.93	6-5	2.36
1950	9-19	2.62	9-19	.93	9-19	1.51	9-19	1.37	9-19	2.52	9-19	2.52	9-19	2.52	9-15	2.52
1951	7-10	4.77	7-10	1.76	7-10	1.82	6-1	2.65	6-1	2.87	6-1	2.87	6-1	2.87	6-1	3.47
1952	6-26	5.78	7-14	1.50	7-14	1.83	7-13	2.16	7-13	2.16	7-13	2.16	7-12	2.20	7-12	2.37
1953	6-7	1.33	6-7	.76	6-7	.85	6-7	.85	6-7	.85	6-7	.85	6-7	.85	6-7	.85
1954	5-22	2.83	5-22	.92	5-22	1.38	5-22	1.39	5-22	1.39	5-22	1.42	5-22	1.42	5-16	1.42

1939	8-11	1.59	8-11	.19	8-11	.19	8-11	.19	8-11	.19	8-11	.19	8-11	.19	8-7	.20
1940	6-8	1.07	6-8	.19	6-8	.21	6-8	.22	6-8	.23	6-8	.23	6-8	.23	6-8	.23
1941	10-8	2.02	6-5	.33	6-5	.37	6-5	.38	6-5	.38	6-8	.60	6-8	.65	6-2	1.07
1942	8-7	2.62	8-7	.60	8-7	.60	8-7	.60	9-2	.81	9-2	.87	9-2	.87	6-20	1.02
1943	6-14	2.47	6-10	.81	6-10	.82	6-10	.82	6-10	1.09	6-10	1.09	6-10	1.32	6-7	2.14
1944	5-27	4.17	5-27	.98	5-27	.99	5-27	.99	5-27	.99	5-27	.99	5-27	1.00	5-20	1.28
1945	6-5	2.72	6-5	.41	6-5	.41	7-16	.46	7-16	.46	7-16	.46	7-16	.46	7-16	.46
1946	8-7	6.58	8-7	.90	8-7	.90	9-5	1.17	9-5	1.30	9-5	1.30	9-5	1.94	9-5	2.12
1947	6-12	2.05	6-12	.64	6-12	.78	6-12	1.14	6-11	1.19	6-11	1.19	6-11	1.19	6-11	1.76
1948	7-18	3.60	7-18	.73	7-18	.74	7-18	.74	7-18	.74	7-18	.74	7-18	.74	7-18	.74
1949	7-13	4.66	5-5	.85	10-9	.91	6-8	1.32	10-9	1.33	10-9	1.33	6-6	1.65	6-5	1.98
1950	9-19	4.15	9-19	1.08	9-19	1.74	9-19	2.98	9-19	3.24	9-19	3.24	9-19	3.24	9-15	3.34
1951	7-10	5.07	7-10	1.71	7-10	1.75	6-1	2.15	6-1	2.37	6-1	2.37	6-1	2.37	6-1	2.90
1952	6-26	7.43	7-14	1.28	6-26	1.43	7-13	1.90	7-13	1.90	7-13	1.90	7-13	1.90	7-6	2.35
1953	6-7	1.97	6-7	.81	6-7	.93	6-7	.93	5-27	1.58	5-27	1.59	5-27	1.59	5-27	1.59
1954	5-22	4.36	5-22	1.03	5-22	1.56	5-22	1.57	5-22	1.66	5-22	1.66	5-22	1.66	5-18	1.89

[illegible]

ANNUAL MAXIMUM DISCHARGES IN INCHES PER HOUR AND ANNUAL MAXIMUM
VOLUMES OF RUNOFF IN INCHES FOR SELECTED TIME INTERVALS

WATERSHED 14-H (44.18)

YEAR	MAXIMUM DISCHARGE DATE RATE	1 HOUR DATE VOL	2 HOURS DATE VOL	6 HOURS DATE VOL	12 HOURS DATE VOL	1 DAY DATE VOL	2 DAYS DATE VOL	8 DAYS DATE VOL
1939	6-20 .36	6-20 .09	6-20 .09	6-20 .17	6-20 .17	6-20 .17	6-20 .21	6-15 .22
1940	5-17 .13	5-17 .06	5-17 .06	5-17 .07	5-17 .07	5-17 .07	5-17 .07	5-17 .07
1941	6-8 1.55	6-8 .28	6-8 .28	6-8 .28	6-8 .40	6-8 .59	6-8 .64	6-2 .91
1942	8-7 3.64	8-7 .77	8-7 .77	9-2 1.03	9-2 1.64	9-2 1.88	9-2 1.88	9-2 2.00
1943	6-10 2.18	6-14 .73	6-14 .74	6-14 .74	6-14 .74	6-10 .85	6-10 1.04	6-7 1.79
1944	5-27 4.38	5-27 .85	5-27 .87	8-25 1.50	8-25 1.50	8-25 1.50	8-25 1.50	8-25 1.99
1945	6-5 2.46	6-5 .51	6-5 .51	6-5 .51	6-5 .51	6-5 .51	6-5 .51	6-5 .51
1946	8-7 1.92	9-5 .60	9-5 .61	9-5 .75	9-5 .75	9-5 .84	9-5 1.28	9-5 1.34
1947	6-17 1.48	6-17 .43	6-17 .49	6-12 .74	6-11 .76	6-11 .76	6-11 .76	6-11 1.24
1948	7-18 2.80	7-18 .52	7-18 .52	7-18 .52	7-18 .52	7-18 .52	7-18 .52	7-18 .52
1949	7-13 3.32	5-5 .91	5-5 1.01	6-8 1.50	6-8 1.54	6-8 1.55	6-6 2.20	6-5 3.18
1950	7-17 2.73	9-19 .63	9-19 1.25	9-19 1.97	9-19 2.11	9-19 2.11	9-19 2.11	9-15 2.12
1951	7-10 3.97	7-10 1.58	6-1 1.80	6-1 2.78	6-1 3.05	6-1 3.05	6-1 3.05	6-1 3.67
1952	7-14 3.20	7-13 1.37	7-13 1.72	7-13 1.93	7-13 1.93	7-13 1.93	7-13 1.93	7-13 1.98
1953	6-7 1.58	6-7 .78	6-7 .87	6-7 .87	6-7 .87	6-7 .87	6-7 .87	6-7 .87
1954	5-22 3.94	5-22 1.01	5-22 1.54	5-22 1.55	5-22 1.68	5-22 1.68	5-22 1.68	5-22 1.90

WATERSHED 15-H (44.19)

1939	8-11 1.11	6-20 .16	6-20 .16	6-20 .32	6-20 .32	6-20 .32	6-20 .36	6-15 .45
1940	6-8 .12	6-8 .04	6-8 .04	6-8 .04	6-8 .04	6-8 .04	6-8 .04	6-8 .04
1941	6-8 2.99	6-5 .54	6-5 .61	6-8 .62	6-8 .75	6-8 .75	6-8 1.00	6-2 1.77
1942	8-7 2.88	8-7 .79	8-7 .79	6-20 .87	9-2 1.25	9-2 1.47	9-2 1.47	9-2 1.57
1943	6-10 2.28	6-14 .81	6-14 .81	6-14 .81	6-14 .81	6-10 1.03	6-10 1.19	6-10 2.00
1944	5-27 3.18	5-27 .88	5-27 .90	5-27 .90	5-27 .90	5-27 .90	8-23 .90	8-23 1.26
1945	6-5 3.26	6-5 .35	6-5 .35	7-16 .47	6-15 .65	6-15 .65	6-15 .65	6-15 .65
1946	9-5 2.93	9-5 .69	9-5 .71	9-7 .77	9-7 .82	9-6 1.03	9-5 1.73	9-5 1.92
1947	6-12 1.76	6-12 .53	6-12 .67	6-12 .88	6-11 .95	6-11 .95	6-11 .95	6-11 1.49
1948	7-18 4.00	7-18 .67	7-18 .67	7-18 .67	7-18 .67	7-18 .67	7-18 .67	7-18 .67
1949	10-10 4.00	7-13 .79	5-5 .85	6-8 1.23	6-8 1.23	6-8 1.23	6-8 1.23	6-5 2.67
1950	7-17 3.51	7-17 .59	7-17 .63	9-19 1.20	9-19 2.06	9-19 2.06	9-19 2.06	9-15 2.06
1951	7-10 5.51	7-10 2.21	7-10 2.24	6-1 2.57	6-1 2.78	6-1 2.78	7-10 3.65	7-10 3.65
1952	7-14 2.82	7-14 1.13	7-14 1.37	7-14 1.52	7-13 1.52	7-13 1.52	7-13 1.52	7-13 1.60
1953	6-7 1.99	6-7 .80	6-7 .91	6-7 .91	6-7 .91	6-7 .91	6-7 .91	6-5 .93
1954	5-22 4.77	5-22 1.09	5-22 1.51	5-22 1.58	5-22 1.95	5-22 1.97	5-22 1.97	5-22 2.25

WATERSHED 16-H (44.20)

1939	6-15 .28	6-15 .08	6-15 .08	6-20 .12	6-12 .12	6-20 .12	6-20 .12	6-15 .21
1940	6-8 1.15	6-8 .28	6-8 .28	6-8 .28	6-8 .28	6-8 .28	6-8 .28	6-8 .28
1941	6-8 1.41	6-8 .37	6-8 .38	6-8 .55	6-8 .64	6-8 .85	6-8 .90	6-2 1.16
1942	8-7 2.89	8-7 .71	8-7 .71	6-20 .75	9-2 .76	9-2 .94	9-2 .94	9-2 .96
1943	6-10 2.78	6-10 .66	6-10 .66	6-10 .66	6-10 .66	6-10 .90	6-10 1.11	6-10 1.84
1944	6-17 3.50	5-11 .56	5-11 .99	5-11 .99	5-11 .99	8-25 1.10	8-25 1.10	8-23 1.87
1945	6-5 3.36	6-5 .68	6-5 .69	6-5 .69	6-5 .69	6-5 .69	6-5 .69	6-5 .69
1946	8-7 4.94	8-7 .76	8-7 .76	8-7 .76	9-5 1.06	9-5 1.17	9-5 1.75	9-5 1.90
1947	6-17 1.85	6-17 .68	6-17 .76	6-12 .94	6-11 .97	6-11 .97	6-11 .97	6-11 1.75
1948	7-18 3.44	7-18 .58	7-18 .59	7-18 .59	7-18 .59	7-18 .59	7-18 .59	7-18 .59
1949	5-5 3.03	5-5 .86	5-5 .87	6-8 1.20	6-8 1.21	6-8 1.21	6-8 1.22	6-5 2.43
1950	7-17 3.25	7-17 .50	9-19 1.02	9-19 2.21	9-19 2.47	9-19 2.47	9-19 2.47	9-15 2.48
1951	7-10 4.47	7-10 1.83	6-1 2.03	6-1 2.94	6-1 3.23	6-1 3.23	6-1 3.23	6-1 3.88
1952	7-14 3.33	7-14 1.43	7-14 1.77	7-13 1.92	7-13 1.92	7-13 1.92	7-13 1.92	7-6 2.06
1953	6-7 2.22	6-7 .99	6-7 1.10	6-7 1.10	6-7 1.10	6-7 1.10	6-7 1.10	6-7 1.10
1954	5-22 4.42	5-22 1.21	5-22 1.91	5-22 1.93	5-22 2.09	5-22 2.09	5-22 2.09	5-22 2.61

WATERSHED 17-H (44.21)

1939	8-11 1.67	6-15 .26	6-15 .26	6-20 .30	6-20 .30	6-20 .30	6-20 .32	6-12 .64
1940	6-8 .11	6-8 .01	6-8 .01	6-8 .01	6-8 .01	6-8 .01	6-8 .01	6-8 .01
1941	6-8 3.03	6-5 .45	6-5 .49	6-5 .50	6-8 .68	6-8 .86	6-8 .93	6-2 1.54
1942	8-7 3.21	8-7 .80	8-7 .80	8-7 .80	8-7 .80	8-5 .80	8-5 .95	8-5 .95
1943	6-14 4.41	6-10 .97	6-10 .97	6-10 .97	6-10 1.37	6-10 1.43	6-10 1.71	6-7 2.65
1944	5-27 4.68	5-27 1.17	5-27 1.20	5-27 1.20	5-27 1.20	5-27 1.21	5-27 1.21	8-23 1.80
1945	6-5 3.00	6-5 .49	6-5 .49	6-5 .49	6-5 .49	6-5 .49	6-5 .49	6-5 .49
1946	8-7 5.63	8-7 .99	8-7 .99	8-7 .99	8-7 .99	8-7 .99	9-5 1.51	9-5 1.69
1947	6-17 1.29	6-17 .45	6-17 .48	6-12 .76	6-11 .78	6-11 .79	6-11 .79	6-11 1.27
1948	7-18 4.81	7-18 .80	7-18 .80	7-18 .80	7-18 .80	7-18 .80	7-18 .80	7-18 .80
1949	10-9 2.31	10-9 .90	10-9 .95	6-8 1.14	10-9 1.31	10-9 1.31	6-7 1.50	6-5 1.94
1950	9-19 2.11	9-19 .80	9-19 1.11	9-19 2.55	9-19 2.92	9-19 2.92	9-19 2.92	9-19 2.92
1951	7-10 4.46	7-10 1.67	7-10 1.73	6-1 3.14	6-1 3.49	6-1 3.49	6-1 3.49	6-1 3.99
1952	7-14 2.70	7-14 .89	7-14 1.19	7-13 1.43	7-13 1.43	7-13 1.43	7-12 1.48	7-6 1.68
1953	6-7 1.51	6-7 .66	6-7 .74	6-7 .74	6-7 .74	6-7 .74	6-7 .74	6-5 .74
1954	5-22 4.11	5-22 1.01	5-22 1.60	5-22 1.63	5-22 1.75	5-22 1.75	5-22 1.75	5-22 2.65

ANNUAL MAXIMUM DISCHARGES IN INCHES PER HOUR AND ANNUAL MAXIMUM
VOLUMES OF RUNOFF IN INCHES FOR SELECTED TIME INTERVALS

WATERSHED 18-H (44.22)

YEAR	MAXIMUM DISCHARGE DATE RATE	1 HOUR DATE VOL	2 HOURS DATE VOL	6 HOURS DATE VOL	12 HOURS DATE VOL	1 DAY DATE VOL	2 DAYS DATE VOL	8 DAYS DATE VOL
1939	8-11 .81	8-11 .32	8-11 .32	8-11 .32	8-11 .32	8-11 .32	8-11 .32	8-11 .32
1940	5-17 .22	5-17 .13	5-17 .14	5-17 .14	5-17 .14	5-17 .14	5-17 .14	5-17 .14
1941	6-5 1.11	6-5 .58	6-5 .68	6-5 .68	6-5 .68	6-5 .68	6-5 .68	6-5 .68
1942	6-20 .90	6-20 .44	6-20 .48	6-20 .51	6-20 .51	6-20 .51	6-20 .51	6-20 .51
1943	6-14 1.16	6-14 .53	6-14 .64	6-14 .65	6-14 .65	6-14 .65	6-14 .65	6-14 .65
1944	5-12 1.11	5-12 .61	5-12 .81	5-11 .87	5-11 .87	5-11 .87	5-11 .87	8-23 .98
1945	6-5 1.46	6-5 .67	6-5 .72	6-5 .72	6-5 .72	6-5 .72	6-5 .72	6-5 .72
1946	8-7 1.44	9-5 .52	9-5 .56	9-5 .58	9-5 .58	9-5 .58	9-5 .58	9-5 .58
1947	6-17 .64	6-12 .46	6-12 .65	6-12 .89	6-12 .89	6-12 .89	6-12 .89	6-12 .89
1948	7-18 .17	7-18 .05	7-18 .05	7-18 .05	7-18 .05	7-18 .05	7-18 .05	7-18 .05
1949	10-9 1.21	6-8 .67	5-5 .81	6-8 .87	6-8 .87	6-8 .87	6-7 .91	6-5 1.02
1950	9-19 .68	9-19 .55	9-19 .87	9-19 1.31	9-19 1.34	9-19 1.34	9-19 1.34	9-15 1.37
1951	6-1 1.49	6-1 1.10	6-1 1.91	6-1 2.58	6-1 2.60	6-1 2.60	6-1 2.60	6-1 2.68
1952	7-14 1.88	7-14 1.07	7-14 1.35	7-14 1.40	7-14 1.40	7-14 1.40	7-14 1.40	7-14 1.40
1953	6-7 .70	6-7 .47	6-7 .57	6-7 .58	6-7 .58	6-7 .58	6-7 .58	6-7 .58
1954	5-22 1.94	5-22 .97	5-22 1.21	5-22 1.27	5-22 1.27	5-22 1.27	5-22 1.27	5-15 1.27
1955	6-27 .09	6-27 .02	6-27 .02	6-27 .02	6-27 .02	6-27 .02	6-27 .02	6-27 .02
1957	6-15 2.07	6-15 .74	6-15 1.08	6-15 2.00	6-15 2.71	6-15 2.81	6-15 3.57	6-10 3.58
1958	6-12 1.31	6-12 .44	6-12 .45	6-12 .45	6-12 .45	6-12 .45	6-12 .45	6-12 .45
1959	7-3 2.42	7-3 2.01	7-3 2.05	7-3 2.05	7-3 2.05	7-3 2.05	7-3 2.05	6-28 2.57
1960	5-15 2.19	5-15 1.16	5-15 1.24	5-15 1.24	5-15 1.24	5-15 1.24	5-15 1.24	5-15 1.58
1961	6-15 .47	6-15 .30	6-15 .42	6-15 .46	6-15 .46	6-15 .46	6-13 .53	6-13 .53
1962	8-23 .71	8-23 .29	8-23 .30	8-23 .30	8-23 .30	8-23 .30	8-23 .30	7-11 .46
1963	9-9 .29	9-10 .14	9-10 .16	9-9 .28	9-9 .30	9-9 .30	9-9 .30	9-3 .31
1964	7-27 .82	7-27 .30	6-11 .44	6-11 .46	6-11 .46	6-11 .46	6-11 .46	6-11 .49
1965	5-21 2.89	5-21 1.80	5-21 2.32	5-21 2.86	5-21 5.30	5-21 5.58	5-21 5.58	5-21 6.02
1966	7-26 .85	7-26 .26	7-26 .28	7-26 .28	7-26 .28	7-26 .28	7-26 .28	7-26 .33
1967	7-8 .64	6-11 .32	6-11 .36	6-11 .37	6-11 .37	6-10 .66	6-10 .66	6-5 .70

Notes: No maximum discharges or flow volumes for 1956.

WATERSHED 19-H (44.23)

1941	10-2 1.91	6-5 .48	6-5 .55	6-8 .66	6-8 .73	6-8 1.21	6-8 1.36	6-2 2.01
1942	8-7 2.12	8-7 .54	9-2 .59	9-2 1.02	9-2 1.66	9-2 1.93	9-2 1.93	9-2 1.95
1943	6-10 1.04	6-10 .37	6-10 .38	6-10 .38	6-10 .38	6-10 .45	6-10 .55	6-7 .82
1944	5-27 4.31	5-27 .99	5-27 1.01	5-27 1.01	5-27 1.01	5-27 1.01	5-27 1.01	5-20 1.21
1945	6-5 1.88	6-5 .31	6-5 .31	7-16 .38	7-16 .38	7-16 .38	7-16 .38	7-16 .38
1946	8-7 2.83	9-5 .78	9-5 .80	9-5 1.07	9-5 1.07	9-5 1.19	9-5 1.65	9-5 1.69
1947	6-17 .90	6-17 .39	6-12 .44	6-12 .79	6-12 .82	6-12 .82	6-12 .82	6-12 1.24
1948	7-18 2.17	7-18 .49	7-18 .49	7-18 .49	7-18 .49	7-18 .49	7-18 .49	7-18 .49
1949	10-10 3.73	10-9 .75	6-8 .90	6-8 1.40	6-8 1.41	6-8 1.43	6-7 1.91	6-5 2.23
1950	9-19 2.09	9-19 .91	9-19 1.60	9-19 2.31	9-19 2.36	9-19 2.36	9-19 2.36	9-19 2.36
1951	7-10 4.14	7-10 1.62	7-10 1.70	6-1 2.25	6-1 2.99	6-1 2.99	6-1 2.99	6-1 3.59
1952	6-26 4.91	7-14 1.15	7-13 1.35	7-13 1.70	7-13 1.70	7-13 1.70	7-12 1.72	7-6 1.97
1953	6-7 1.29	6-7 .67	6-7 .76	6-7 .76	6-7 .76	6-7 .76	6-7 .76	6-7 .76
1954	5-22 2.09	5-22 .76	5-22 1.19	5-22 1.21	5-22 1.33	5-22 1.33	5-22 1.33	5-15 1.52

WATERSHED 20-H (44.24)

1941	6-5 1.31	6-5 .50	6-5 .56	6-5 .57	6-5 .57	6-5 .64	6-5 .64	6-2 1.75
1942	8-7 2.74	8-7 .56	9-2 .76	9-2 1.21	9-2 1.97	9-2 1.97	9-2 2.25	9-2 2.41
1943	6-10 2.57	6-10 .73	6-10 .74	6-10 .74	6-10 .89	6-10 .94	6-10 1.11	6-7 1.72
1944	5-27 3.94	5-27 .96	5-27 .99	5-27 .99	5-27 .99	5-27 .99	5-27 .99	5-20 1.21
1945	7-16 2.06	7-16 .49	7-16 .49	7-16 .77	7-16 .77	7-16 .77	7-16 .77	7-16 .77
1946	9-5 1.93	9-5 .75	9-5 .76	9-5 .77	9-5 .77	9-5 .97	9-5 1.70	9-5 1.83
1947	6-12 1.43	6-17 .49	6-12 .56	6-12 .84	6-11 .89	6-11 .89	6-11 .89	6-11 1.41
1948	6-26 1.00	6-26 .26	6-26 .32	6-26 .36	6-26 .36	6-26 .36	6-26 .36	6-21 .50
1949	5-5 1.96	5-5 .65	5-5 .68	6-8 1.24	6-8 1.26	6-8 1.26	6-7 1.70	6-5 1.87
1950	7-17 1.63	9-19 .74	9-19 1.29	9-19 1.85	9-19 1.93	9-19 1.93	9-19 1.93	9-19 1.93
1951	7-10 4.31	7-10 1.42	7-10 1.46	7-10 1.48	7-10 1.56	7-10 2.46	7-10 2.98	7-10 3.06
1952	7-14 2.79	7-14 1.14	7-13 1.41	7-13 1.53	7-13 1.53	7-13 1.53	7-13 1.53	7-13 1.61
1953	6-7 .66	6-7 .42	6-7 .47	6-7 .47	6-7 .47	6-7 .47	6-7 .47	6-7 .47
1954	5-22 4.58	5-22 .95	5-22 1.07	5-22 1.07	5-22 1.07	5-22 1.07	5-22 1.07	5-22 1.07

WATERSHED 21-H (44.25)

1941	6-8 1.58	6-5 .50	6-21 .65	6-21 .74	6-21 .74	6-8 1.36	6-8 1.36	6-2 2.06
1942	8-7 2.57	8-7 .54	6-20 .54	6-20 .57	6-20 .57	6-20 .57	6-20 .61	6-20 1.29
1943	6-10 2.04	6-10 .52	6-10 .53	6-10 .53	6-10 .58	6-10 .62	6-10 .69	6-10 1.07
1944	5-27 2.17	5-27 .44	5-27 .46	8-25 .66	8-25 .66	8-25 .66	8-25 .66	8-25 1.02
1945	6-5 3.17	6-5 .59	6-5 .60	6-5 .60	6-15 .70	6-15 .70	6-15 .70	6-15 .70
1946	9-5 1.40	9-5 .65	9-5 .66	9-5 .78	9-5 .78	9-5 .83	9-5 1.26	9-5 1.30
1947	6-17 1.24	6-17 .30	6-17 .35	6-12 .56	6-12 .57	6-12 .57	6-12 .57	6-12 .92
1948	7-18 2.49	7-18 .51	7-18 .52	7-18 .52	7-18 .52	7-18 .52	7-18 .52	7-18 .52
1949	5-5 4.00	5-5 .92	5-5 .98	6-8 1.44	6-8 1.45	6-8 1.47	6-6 2.09	6-5 2.95
1950	7-17 2.44	9-19 .82	9-19 1.36	9-19 2.11	9-19 2.28	9-19 2.28	9-19 2.28	9-19 2.28
1951	6-1 2.64	7-10 1.55	7-10 1.58	7-10 1.59	7-10 1.64	7-10 2.40	7-10 2.97	7-10 3.11
1952	7-14 3.80	7-14 1.61	7-13 2.01	7-13 2.15	7-13 2.15	7-13 2.15	7-13 2.15	7-13 2.29
1953	6-7 1.58	6-7 .80	6-7 .90	6-7 .91	6-7 .91	6-7 .91	6-7 .91	6-7 .91
1954	5-22 3.45	5-22 1.02	5-22 1.42	5-22 1.44	5-22 1.53	5-22 1.53	5-22 1.53	5-22 1.54

[illegible]

WATERSHED 23-H (44.27)

[illegible]

WATERSHED 24-II (44.28)

1941	6-8	2.14	6-5	.57	6-5	.72	6-5	.74	6-8	.75	6-8	1.13	6-8	1.24	6-2	2.29
1942	6-5	2.28	6-5	.76	6-5	.77	6-5	.77	9-2	.99	9-2	1.10	9-2	1.10	9-2	1.53
1943	6-14	1.83	6-14	.54	6-14	.56	6-14	.56	6-14	.56	6-14	.56	6-10	.64	6-10	1.20
1944	5-27	2.12	5-27	.78	5-27	.80	5-27	.80	5-27	.80	5-27	.80	5-27	.85	5-25	1.05
1945	6-5	1.36	6-5	.31	6-5	.31	6-5	.31	6-5	.31	6-5	.31	6-5	.31	6-5	.31
1946	8-7	2.36	8-7	.55	8-7	.55	8-7	.55	8-7	.55	8-7	.55	9-5	.96	9-5	1.07
1947	6-11	.90	6-12	.43	6-12	.48	6-12	.78	6-12	.80	6-12	.80	6-12	.80	6-12	1.16
1948	7-18	1.46	7-18	.17	7-18	.17	7-18	.17	7-18	.17	7-18	.17	7-18	.17	7-18	.17
1949	10-9	2.28	10-9	.95	6-8	1.03	6-8	1.18	10-9	1.40	10-9	1.40	10-9	1.40	6-5	1.67
1950	9-19	3.30	9-19	.90	9-19	1.41	9-19	2.52	9-19	2.56	9-19	2.56	9-19	2.56	9-15	2.57
1951	6-1	2.66	6-1	1.32	6-1	1.93	6-1	3.24	6-1	3.62	6-1	3.62	6-1	3.62	6-1	4.32
1952	6-26	3.42	7-14	1.13	7-14	1.52	7-13	1.96	7-13	1.97	7-13	1.97	7-13	1.97	7-6	2.56
1953	6-7	.70	6-7	.37	6-7	.40	6-7	.40	6-7	.40	6-7	.40	6-7	.40	6-7	.40
1954	5-22	3.44	5-22	.94	5-22	1.22	5-22	1.23	5-22	1.24	5-22	1.24	5-22	1.24	5-22	1.57

1963	6-25	.04	6-25	.01	6-25	.01	6-25	.01	6-25	.01	6-25	.01	6-25	.01
1964	6-21	.13	6-21	.04	6-21	.04	6-21	.04	6-21	.04	6-21	.04	6-21	.04
1965	5-21	1.75	5-21	.90	5-21	1.53	5-21	2.64	5-21	2.64	5-21	2.64	5-21	2.81
1966	6-8	.04	6-8	.01	6-8	.01	6-8	.01	6-8	.01	6-8	.01	6-8	.01
1967	7-8	.32	7-8	.09	7-8	.10	7-8	.10	7-8	.10	7-8	.10	7-8	.10

SELECTED RUNOFF EVENTS

WATERSHED W-3 (44.01)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
Event of June 20, 1939										
				RG	B-28-R					
5-20	.87	.017	6-20	1304	.00	.00	6-20	1319	.0000	.0000
5-22	.38	.002		1306	1.80	.06		1330	.072	.0026
5-26	.45	.00		1310	1.20	.14		1333	.127	.0077
5-27	.02	.00		1313	2.00	.24		1337	.169	.0176
6-1	.37	.00		1316	4.00	.44		1342	.233	.0335
6-2	.03	.00		1320	1.05	.51		1347	1.05	.0874
6-8	.27	.00		1326	1.20	.63		1350	1.15	.1429
6-9	.37	.00		1335	1.00	.78		1355	1.07	.2365
6-12	.33	.010		1350	.48	.90		1400	.877	.3176
6-15	.60	.209		1620	.01	.93		1410	.574	.4374
				1635	.52	1.06		1420	.421	.5188
				1640	1.32	1.17		1435	.287	.6055
				1650	.24	1.21		1500	.148	.6944
				1700	.12	1.23		1600	.044	.7772
								1620	.030	.7894
				RG	A-31-R					
				1303	.00	.00		1800	.040	.8609
				1306	3.40	.17		2100	.002	.8992
				1310	4.05	.44		2400	T	.9015
				1315	6.36	.97	6-21	0500	T	.9025
				1320	5.76	1.45		1700	T	.9041
				1330	2.10	1.80		1900	T	.9041
				1402	.37	2.01				
				1620	.00	2.01				
				1630	.48	2.09				
				1640	.60	2.19				
				1650	.48	2.27				
				1710	.06	2.29				
				RG	B-36-R					
				1304	.00	.00				
				1310	1.20	.12				
				1315	3.48	.41				
				1330	2.00	.91				
				1340	.96	1.07				
				1400	.24	1.15				
				1616	.00	1.15				
				1623	.43	1.20				
				1630	1.03	1.32				
				1700	.34	1.49				
Event of July 10, 1951										
				RG	B-28-R					
6-13	.78	.00	7-10	0455	.00	.00	7-10	0604	.0000	.0000
6-14	.10	.26		0500	2.16	.18		0610	.172	.0076
6-20	.48	.00		0550	.14	.30		0620	.392	.0545
6-22	.88	.29		0556	1.40	.44		0630	1.54	.2351
6-25	1.75	1.19		0600	3.00	.64		0640	1.71	.5001
6-27	.20	.01		0610	5.16	1.50		0645	1.74	.6434
				0612	5.70	1.69		0650	1.70	.7867
				0630	1.80	2.23		0710	.940	1.2401
				0702	1.14	2.84		0730	.478	1.4602
				0802	.05	2.89		0800	.156	1.6057
				RG	A-31-R					
				0459	.00	.00		1000	.006	1.6620
				0501	.90	.03		1745	.001	1.6801
				0506	1.92	.19				
				0510	.15	.20				
				0542	.00	.20				
				0554	.50	.30				
				0610	2.66	1.01				
				0632	1.53	1.57				
				0638	2.10	1.78				
				0648	1.02	1.95				
				0658	.42	2.02				
				0748	.05	2.06				
				1048	.01	2.08				
				RG	B-23-R					
				0455	.00	.00				
				0503	1.95	.26				
				0506	.40	.28				
				0544	.00	.28				
				0548	.30	.30				
				0556	1.50	.50				
				0602	3.30	.83				
				0608	5.50	1.38				
				0614	4.80	1.86				
				0620	2.30	2.09				
				0630	1.38	2.32				
				0638	2.48	2.65				
				0646	1.12	2.80				
				0658	.40	2.88				
				0818	.08	2.94				
				1018	.01	2.96				

Watershed conditions: 22.8% of area in corn, 4.6% in sorghum rows, 33.9% in wheat, 13.3% in oats, 2.1% in barley, 1.0% in rye, 1.7% in sorghum, 1.7% in meadow, 15.4% in pasture, 0.4% fallow, 2.5% in farmsteads and 0.6% in roads. The corn was 12" high, much of it cultivated within the week preceeding. Oats, wheat, and barley, 10 to 14" high, partly harvested. Meadows well covered. Pastures very poor, grass 1" high. Sorghums sprouted. All cultivation in straight rows.

Watershed conditions: 27.4% in corn, 19.1% in wheat, 18.7% in oats, 2.1% in meadow, 15.8% in pasture, 5.8% in sorghum rows, .4% sorghum drilled, 1.7% sudan grass, 1.3% bromegrass, .8% sweet clover, 3.8% in fallow, 2.5% in farmsteads, and .6% in roads. The corn was 20-30" high and in good condition; the oats were 16-18" high, poor condition, and headed out; wheat was 18-20" high, in fair condition; the meadow was 12-16" high, in good condition; and the pasture was 4-5" high, in good condition. All cultivation was in straight rows.

SELECTED RUNOFF EVENTS

A37

WATERSHED W-3 (44.01)

ANTECEDENT CONDITION			RAINFALL				RUNOFF						
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)			
<u>Event of July 10, 1951 - Continued</u>													
			7-10	RG 0500 0910	B-32-R .00	.00 2.83							
				RG 0457 1239	B-33-R .00 T	.00 2.15							
				RG 0452 0859	B-36-R .00	.00 2.60							
				RG 0500 0914	B-38-R .00	.00 2.66							
<u>Event of June 7, 1953</u>													
5-10	.15	.00	6-7	RG 1650	B-28-R .00	.00	6-7	1706	.0000	.0000			
5-17	.50	.00		1654	1.20	.08		1712	.113	.0021			
5-27	2.27	.491		1701	2.31	.35		1718	.287	.0222			
6-2	.18	.00		1707	3.20	.67		1730	.542	.0992			
6-6	.50	.00		1720	1.39	.97		1746	.718	.2757			
Watershed conditions: 46.1% of area in corn, 13.7% in oats, 15.8% in pasture, 2.1% in meadow, 3.1% in bromegrass, 1.7% in sudan grass, .4% in millet, 7.5% in fallow, 1.7% in alfalfa, 4.8% in sorghum row, 2.5% in farmsteads, and .6% in roads. The corn was about 7" high, the wheat about 20" high, oats 12", milo 3", meadow 6", pasture 3" and bromegrass about 20" high. The corn was planted about May 15. All cultivation was in straight rows.							1734	1.24	1.26	1816	.478	.5786	
							1800	.49	1.47	1856	.202	.7966	
							1836	.20	1.59	1916	.081	.8444	
							RG	A-31-R		1956	.013	.8682	
							1651	.00	.00	2056	.003	.8748	
							1654	2.20	.11	6-8	0216	T	.8787
							1656	1.50	.16	0716	.0000	.8787	
							1659	3.40	.33				
							1701	1.50	.38				
							1706	2.52	.59				
	1708	4.20	.73										
	1712	1.35	.82										
	1720	1.35	1.00										
	1722	.60	1.02										
	1724	1.50	1.07										
	1736	1.10	1.29										
	1740	1.20	1.37										
	1746	.50	1.42										
	1800	.21	1.47										
	1814	.30	1.54										
	1822	.30	1.58										
	RG	B-23-R		1650	.00	.00							
	1652	2.10	.07										
	1654	.90	.10										
	1657	3.20	.26										
	1701	2.40	.42										
	1715	1.93	.87										
	1724	.93	1.01										
	1733	1.40	1.22										
	1745	.70	1.36										
	1815	.28	1.50										
	1833	.07	1.52										
	RG	Met.		1655	.00	.00							
	1838		1.54										
	RG	B-25-R		1650	.00	.00							
	1822		1.61										
	RG	B-32-R		1653	.00	.00							
	1901		1.54										
	RG	B-33-R		1654	.00	.00							
	1842		1.55										
	RG	B-36-R		1652	.00	.00							
	1840		1.59										
	RG	B-38-R		1654	.00	.00							
	1854		1.85										

Watershed conditions: 46.1% of area in corn, 13.7% in oats, 15.8% in pasture, 2.1% in meadow, 3.1% in bromegrass, 1.7% in sudan grass, .4% in millet, 7.5% in fallow, 1.7% in alfalfa, 4.8% in sorghum row, 2.5% in farmsteads, and .6% in roads. The corn was about 7" high, the wheat about 20" high, oats 12", milo 3", meadow 6", pasture 3" and bromegrass about 20" high. The corn was planted about May 15. All cultivation was in straight rows.

SELECTED RUNOFF EVENTS

A38

WATERSHED W-3 (44.01)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in./hr)	Acc. (in.)	Date	Time	Rate (in./hr)	Acc. (in.)
Event of April 22-23, 1957										
3-23	.85	T	4-22	RG	B-32-R	.00	4-22	1950	.0000	.0000
3-24	.29	.00		1810	.00	.08		1958	.0020	.0001
3-31	.07	.01		1930	.06	.11		2002	.0064	.0004
4-2	.61	.01		1940	.18	.40		2010	.158	.0119
4-3	.52	.00		1950	1.74	.68		2016	.197	.0297
				1956	2.80					
4-11	.02	.00		2010	1.68	1.07		2026	.173	.0605
4-17	.02	.00		2200	.15	1.34		2030	.219	.0736
				2230	.02	1.35		2036	.404	.1042
				2250	.18	1.41		2040	.404	.1311
				2300	.00	1.41		2100	.223	.2373
Watershed conditions: Crops in following condition:										
Corn - not planted										
Wheat - 3" high, good condition										
Oats - just planted										
Sorghum - not planted										
Alfalfa - fair condition, with some winter kill.										
Pasture and meadow dormant with fair cover. Seed bed preparation for corn and sorghum was well under way. The land use in percentage of the watershed area was as follows:										
Oats	6.5%			RG	A-31-R	.00		2130	.0903	.3160
Wheat	16.5%			1800	.00	.00		2150	.0419	.3380
Fallow	9.0%			1930	.02	.03		2220	.0202	.3535
Sorghum	38.0%			1936	.10	.04		2250	.0145	.3622
Alfalfa	1.5%			1940	2.85	.23		2320	.0091	.3681
Sweet Clover	2.0%			1944	1.95	.36	4-23	0730	.0000	.3771
Sudan	2.5%									
Pasture	18.5%			2000	2.51	1.03				
Meadow	2.0%			2004	1.65	1.14				
Roads	1.0%			2020	.26	1.21				
Farmsteads	2.5%			2150	.14	1.42				
				2230	.03	1.44				
				2300	.16	1.52				
				RG	B-10-R	.00				
				1740	.00	.00				
				1830	.05	.04				
				1930	.00	.04				
				1936	1.00	.14				
				1940	2.70	.32				
				1946	1.90	.51				
				1948	3.00	.61				
				1952	2.55	.78				
				1958	1.80	.96				
				2000	.90	.99				
				2006	2.10	1.20				
				2300	.12	1.56				
				RG	Met.	.00				
				1756	.00	.00				
				2303		1.43				
				RG	B-33-R	.00				
				1816	.00	.00				
				2300		1.45				
				RG	B-36-R	.00				
				1810	.00	.00				
				2300		1.48				
Event of May 1-2, 1957										
4-2	.61	.01	5-1	RG	B-32-R	.00	5-1	1516	.0000	.0000
4-3	.52	.01		1440	.00	.01		1528	.0091	.0003
4-11	.02	.00		1500	.03	.01		1530	.0301	.0010
4-17	.02	.00		1504	.00	.22		1542	.0779	.0124
4-22	1.50	.38		1510	2.10	.61		1558	.205	.0506
				1536	.90					
4-30	.25	.00		1544	2.63	.96		1604	.219	.0718
				1556	1.55	1.27		1608	.301	.0895
				1600	.75	1.32		1612	.466	.1158
				1700	.08	1.40		1616	.466	.1469
				1800	.02	1.42		1622	.447	.1925
Watershed conditions: Crops in following condition:										
Corn - not planted										
Wheat - 4" high, good condition										
Oats - just coming up										
Sorghum - not planted										
Alfalfa - good condition										
Meadow - 2" high, good condition										
Pasture - 2" high, good condition										
Moisture down 26" on crop land and 19" on meadow. Seed bed preparation for sorghum and corn almost completed. Watershed predominantly in straight row farming. The land use in percentage of the watershed area was as follows:										
Oats	6.5%			RG	A-31-R	.00		1628	.412	.2355
Wheat	16.5%			1420	.00	.00		1648	.219	.3420
Fallow	9.0%			1500	.04	.03		1658	.165	.3740
Sorghum	38.0%			1520	1.11	.40		1718	.0716	.4128
Alfalfa	1.5%			1524	.30	.42		1728	.0427	.4224
Sweet Clover	2.0%			1540	1.84	.91				
Sudan	2.5%							1748	.0197	.4322
Pasture	18.5%			1550	1.14	1.10		1828	.0066	.4403
Meadow	2.0%			1554	2.10	1.24	5-2	1828	.0000	.4470
Roads	1.0%			1634	.16	1.35				
Farmsteads	2.5%			1804	.05	1.42				
				RG	B-10-R	.00				
				1434	.00	.00				
				1440	.10	.01				
				1503	.00	.01				
				1510	1.54	.19				
				1522	1.10	.41				
				1534	.45	.50				
				1540	3.10	.81				
				1556	1.31	1.16				
				1606	.24	1.20				
				1638	.04	1.22				
				1650	.00	1.22				
				2000	.01	1.27				

SELECTED RUNOFF EVENTS

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
<u>Event of June 15, 1957</u>										
				RG	B-32-R					
5-29	.84	.04	6-15	1051	1.00	.00	6-15	1116	.0000	.0000
5-31	.33	.01		1105	1.63	.38		1132	.0091	.0009
6-10	.78	.04		1117	1.45	.67		1145	.160	.0236
6-13	.86	.09		1127	1.62	.94		1200	.233	.0705
				1133	.90	1.03		1210	.629	.1363
Watershed conditions: The wheat was fully headed, about 4' high, and in excellent condition; the sorghum was not out of the ground. Corn was about 6" high with poor stand. Pasture was in excellent condition with height of 12". Meadow in excellent condition, heading out, and about 14" high. All cultivation was in straight rows. The land use in percentage of the watershed area was as follows:				1137	2.70	1.21	1215	1.10	.2084	
				1142	5.64	1.68	1218	1.18	.2654	
				1146	2.40	1.84	1230	.767	.4500	
				1151	1.08	1.93	1247	.555	.5701	
				1246	.05	1.98	1250	.412	.6506	
				1346	.01	1.99	1320	.197	.7913	
				RG	A-31-R		1420	.0443	.9088	
Oats	6.5%			1058	.00	.00	1500	.0145	.9266	
Wheat	16.5%			1102	1.05	.07	1730	.0022	.9406	
Fallow	9.0%			1108	1.60	.23				
Sorghum	38.0%			1110	2.10	.30				
Alfalfa	1.5%			1116	1.20	.42				
Sweet Clover	2.0%			1121	1.32	.53				
Sudan	2.5%			1125	2.70	.71				
Pasture	18.5%			1138	1.52	1.04				
Meadow	2.0%			1143	3.00	1.29				
Roads	1.0%			1146	5.20	1.55				
Farmsteads	2.5%			1150	2.25	1.70				
				1155	.96	1.78				
				1200	.48	1.82				
				1210	.24	1.86				
				RG	B-10-R					
				NR						
				RG	B-33-R					
				1059	.00	.00				
				1105	.50	.05				
				1111	1.30	.18				
				1115	3.00	.38				
				1125	1.08	.56				
				1135	1.62	.83				
				1145	1.20	1.03				
				1155	4.08	1.71				
				1201	1.50	1.86				
				1231	.14	1.93				
				RG	Met					
				1104	.00	.00				
				1234		1.92				
				RG	B-36-R					
				1104	.00	.00				
				1340		2.09				

Event of June 12, 1958

				RG	B-32-R					
5-13	.10	.00	6-12	0154	.00	.00	6-12	0208	.0000	.0000
5-15	.64	.00		0200	1.00	.10		0216	.0043	.0001
5-16	.25	.00		0206	3.40	.44		0224	.0829	.0059
5-26	.29	.00		0211	6.60	.99		0228	.0977	.0119
5-27	.15	.00		0213	1.80	1.05		0236	.0992	.0250
6-6	.12	.00		0220	2.57	1.35		0238	.0940	.0283
				0225	.96	1.43		0245	.109	.0401
				0242	.18	1.48		0306	.127	.0814
				0252	.00	1.48		0320	.176	.1166
				0311	.73	1.71		0327	.182	.1375
				0444	.00	1.71		0350	.140	.2001
				0447	1.60	1.79		0416	.0509	.2398
				RG	A-31-R			0428	.0394	.2488
Corn - 6" high, poor stand				0158	.00	.00		0500	.0163	.2636
Wheat - 4' high, excellent				0202	3.30	.22		0528	.0069	.2690
Oats - 2' high, good condition				0213	3.93	.94				
Alfalfa - cut, excellent condition				0222	1.87	1.22	1316	.0000	.2751	
Meadow - 10" high, good condition				0232	.36	1.28				
Watershed predominantly straight row framed. The land use in percentage of the watershed area was as follows:				0256	.05	1.30				
Corr	15.5%			0316	.54	1.48				
Wheat	9.5%			0446	.00	1.48				
Barley	1.5%			0449	.60	1.51				
Fallow	34.0%			RG	B-10-R					
Sorghum	11.5%			0152	.00	.00				
Alfalfa	1.5%			0202	1.20	.20				
Sudan	2.5%			0206	3.00	.40				
Pasture	18.5%			0215	4.67	1.10				
Meadow	2.5%			0221	2.20	1.32				
Roads	1.0%									
Farstead	2.5%			0238	.42	1.14				
				0255	.00	1.44				
				0317	.60	1.66				
				0442	.00	1.66				
				0446	.30	1.68				
				RG	Met.					
				0152	.00	.00				
				0506		1.84				
				RG	B-33-R					
				0152	.00	.00				
				0318		1.52				
				RG	B-36-R					
				0149	.00	.00				
				0451		1.72				

SELECTED RUNOFF EVENTS

WATERSHED W-3 (44.01)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
Event of May 15-16, 1960										
				RG	B-32-R					
4-16	.21	.00	5-15	2057	.00	.00	5-15	2152	.0000	.0000
4-25	.08	.00		2101	1.05	.07		2201	.0695	.0033
4-27	.06	.00		2113	.40	.15		2209	.270	.0211
4-28	.11	.00		2145	.19	.25		2215	.425	.0589
4-29	.30	.00		2155	2.76	.71		2223	.375	.1161
5-3	.15	.00		2200	1.56	.84		2227	.555	.1426
5-5	1.61	.19		2208	5.03	1.51		2231	.880	.1904
5-6	.13	T		2215	1.12	1.64		2234	.913	.2352
				2229	2.18	2.15		2239	.932	.3117
				2243	.30	2.22		2243	.932	.3743
Watershed conditions: Crops in fol-										
lowing condition:										
Corn - just planted								RG	A-31-R	
Wheat - about 12" tall, excellent								2056	.00	.00
Oats - 4" tall, good condition								2106	.36	.10
Sorghum - some planted								2114	.60	.14
Alfalfa - about 10" tall, good								2142	.40	.19
Meadow - 4" tall, good								2156	2.14	.69
Pasture - 2" tall, fair								2210	3.81	1.58
Ground too wet for good tillage.								2220	.84	1.72
Pasture and meadow with fair ground								2232	2.70	2.26
cover. Watershed predominantly in								2238	.01	2.28
straight-row farming. The land use										
in percentage of the watershed area										
was as follows:										
								RG	B-10-R	
								2056	.00	.00
								2104	1.13	.15
								2142	.11	.22
								2152	1.80	.52
								2156	4.80	.84
Corn	22.2%			2210	3.42	1.64				
Sorghum	20.7%			2216	.40	1.68				
Pasture	16.8%			2229	2.40	2.20				
Wheat	14.6%			2238	.53	2.28				
Fallow	13.0%									
Sudan	3.8%									
Alfalfa	2.7%									
Meadow	2.2%									
Roads	2.1%									
Farmsteads	1.9%									
				RG	Met.					
				2058		.00				
				2258		2.28				

Thiessen weighted average 2.26

Event of August 11, 1961										
7-13	.29	.00	8-11	RG	B-32-R	.00	8-11	0044	.0000	.0000
7-18	.17	.00		0028	1.00	.09		0052	.0020	.0002
7-20	.19	.00		0032	1.35	.40		0100	.0612	.0028
7-21	.03	.00		0039	2.66	1.30		0104	.109	.0084
7-22	.18	.00		0052	4.15	1.43		0112	.144	.0261
				0054	3.90					
7-26	.14	.00		0100	.70	1.50		0124	.121	.0530
8-1	.22	.00		0114	.30	1.57		0130	.115	.0648
8-4	.08	.00		0150	.12	1.64		0150	.121	.1038
								0208	.134	.1421
								0234	.109	.1967
Watershed conditions: Crops in following condition:				RG	A-31-R	.00				
Corn - about 7' tall, ears forming				0028	.00	.10		0254	.0520	.2219
Wheat - harvested, stubble fields cultivated				0030	3.00	.72		0314	.0276	.2340
Oats - harvested, stubble fields cultivated				0040	3.72	1.09		0344	.0104	.2473
Sorghum - about 3½' tall, heading and in good condition				0045	4.44	1.54		0414	.0055	.2473
Alfalfa - 4", poor stand				0052	3.86			0504	.002	.2504
Meadow - 15" high, good				0058	.90	1.63				
Pasture - 5" high, good				0128	.20	1.73	1004	T	.2544	
All fields were very dry; watershed was predominantly straight-row farmed. Land use in percentage of the watershed area was as follows:				0158	.08	1.77				
				RG	B-10-R	.00				
Fallow	27.4%			0026	.00	.10				
Sorghum	20.0%			0030	1.50	1.47				
Pasture	17.6%			0050	4.11	1.57				
Wheat	16.4%			0100	.60	1.67				
Corn	9.8%			0126	.23	1.67				
Sudan	2.5%									
Meadow	2.2%			RG	B-33-R	.00				
Roads	2.1%			0029		1.78				
Farmsteads	1.5%			0149						
Alfalfa . . . . .	.5%									
				RG	B-36-R	.00				
				0026		1.71				
				0150						

Thiessen weighted average 1.70

SELECTED RUNOFF EVENTS

WATERSHED W-3 (44.01)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
Event of August 23, 1962										
				RG	B-32-R					
7-26	.07	.00	8-23	1919	.00	.00	8-23	1940	.0000	.0000
7-27	.65	.06		1932	.23	.05		1950	.0168	.0021
7-29	.06	.00		1937	1.56	.18		2000	.1760	.0180
8-2	.17	.00		1948	4.31	.97		2010	.2600	.0543
8-4	.47	.03		1953	3.12	1.23		2020	.2100	.0934
8-10	.12	.00		2000	2.40	1.51		2040	.2700	.1734
8-11	.04	.00		2003	1.80	1.60		2100	.1760	.2479
8-15	.05	.00		2010	.51	1.66		2130	.1150	.3207
8-22	.09	.00						2200	.0612	.3647
8-23	.58	.00		RG	A-31-R			2230	.0241	.3860
				1920	.00	.00				
				1924	1.10	.11		2330	.0047	.4004
				1936	.25	.16		2400	.0022	.4022
Watershed conditions:				1946	3.24	.70	8-24	0030	.0016	.4032
Corn - 8' high, ears well filled				1950	1.20	.78				
Wheat - harvested										
Oats - harvested				2001	2.29	1.20				
Sorghum - 5' tall, good condition				2006	1.20	1.30				
				2010	.60	1.34				
Alfalfa - 12" high, good condition				RG	B-10-R					
Meadow - 18" high, good condition				1920	.00	.00				
				1932	.10	.02				
The land use in percentage of the watershed was as follows:				1934	1.50	.07				
				1943	3.46	.59				
				1952	2.06	.90				
Corn	9%			1959	1.62	1.09				
Sorghum	22%			2007	.83	1.20				
Oats	1%			2020	.14	1.23				
Wheat	26%									
Fallow	17%			RG	B-33-R					
Pasture	18%			1919	.00	.00				
Meadow	2%			1929	.18	.03				
Sudan	2%			1937	.53	.10				
Farm Yard	1%			1943	1.50	.25				
Roads	2%			1947	4.05	.52				
Note: Watershed was predominately farmed in straight rows.				1953	3.40	.86				
				1956	2.80	1.00				
				2001	2.16	1.18				
				2005	3.15	1.37				
				2009	1.65	1.46				
				2015	.50	.51				
				2020	.24	1.53				
				2030	.06	1.54				
				RG	B-36-R					
				1920	.00	.00				
				1926	.70	.07				
				1934	.00	.07				
				1937	1.80	.16				
				1942	3.60	.46				
				1945	6.00	.76				
				1953	4.65	1.38				
				1958	2.28	1.57				
				2002	3.00	1.77				
				2010	.60	1.85				
				2015	.12	1.86				
				5 RG	AVG	1.53				

Watershed conditions:
Corn - 8' high, ears well
filled

Wheat - harvested

Oats - harvested

Sorghum - 5' tall, good
condition

Alfalfa - 12" high, good
condition

Meadow - 18" high, good
condition

The land use in percentage
of the watershed was as
follows:

Corn 9%
Sorghum 22%
Oats 1%
Wheat 26%
Fallow 17%
Pasture 18%
Meadow 2%
Sudan 2%
Farm Yard 1%
Roads 2%

Note: Watershed was predomi-
nately farmed in straight rows.

Event of September 9, 1963

4 RG			RG	B-36-R						
8-11	.10	.00	9-9	1515	.00	.00	9-9	1516	.0001	.0000
8-12	.44	.00		1517	1.50	.05		1524	.0047	.0003
8-17	.09	.00		1521	2.40	.21		1530	.0177	.0014
8-18	.75	.00		1524	3.00	.36		1533	.0612	.0034
8-23	.13	.00		1527	1.00	.41		1540	.1730	.0171
8-27	.06	.00		1535	2.70	.77		1550	.2030	.0484
9-1	1.85	.10		1539	1.20	.85		1556	.3260	.0748
9-4	.44	.07		1543	.30	.87		1602	.6290	.1226
9-7	.10	.00		1546	2.60	1.00		1610	.7810	.2166
9-9	.41	.06		1549	5.40	1.27		1614	.8450	.2708
				1553	2.40	1.43		1620	.7670	.3514
				1606	.55	1.55		1626	.6290	.4212
				1611	.48	1.59		1646	.3130	.5782
				1711	.16	1.69		1700	.2100	.6393
				RG	A-12-R			1718	.1370	.6913
				1518	.00	.00		1730	.0804	.7130
				1522	3.15	.21		1736	.0612	.7201
				1525	.40	.23		1750	.0346	.7313
				1527	2.70	.32		1810	.0172	.7400
				1530	2.00	.42		1900	.0064	.7498
				1534	1.20	.50		20.0	.0025	.7543
				1540	2.20	.71		2200	.0006	.7543
				1543	.80	.75		2330	.0003	.7580
				1547	1.65	.86	9-10	0100	.0001	.7583
				1551	5.40	1.22				

Watershed conditions:
Sorghum: Approximately 5-6'
high and mature, some extra
growth prior to selected event
due to rainfall in early Sept.
Last cultivation July 10-20 with
row crop cultivator.
Wheat: Approximately one-half
of wheat stubble was disked or
plowed by August 15th; balance
idle.
Fallow: Cultivated from August
20 to 30 with surface type
equipment; soil very dry.
Alfalfa: Small amount of growth
from second cutting, July 20 to
Sept. 9.
Pasture: Grass 1-4' high,
brown from drought and
overgrazed.

(Continued on next page)

SELECTED RUNOFF EVENTS

WATERSHED W-3 (44.01)

ANTECEDENT CONDITION			RAINFALL			RUNOFF				
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)

Event of September 9, 1963 (Continued)

Watershed conditions:
(Continued)

Corn. 4%
Sorghum 30%
Wheat 18%
Fallow 21%
Pasture 18%
Meadow 2%
Sudan 3%
Farm Yard 2%
Roads 2%

9-9	1556	3.00	1.47
	1600	2.40	1.63
	1607	.34	1.67
	1616	.27	1.71
	1640	.05	1.73
	1720	.06	1.77
	RG	B-10-R	
	1519	.00	.00
	1522	3.00	.15
	1525	.40	.17
	1537	2.35	.64
	1542	.72	.70
	1544	1.50	.75
	1546	2.70	.84
	1551	5.16	1.27
	1557	1.80	1.45
	1610	.28	1.51
	1706	.09	1.58
	1800	.06	1.63
	RG	B-31-R	
	1515	.00	.00
	1517	1.50	.05
	1521	2.55	.22
	1524	3.20	.38
	1527	1.00	.43
	1535	2.85	.81
	1539	1.20	.89
	1543	.30	.91
	1546	2.80	1.05
	1549	5.60	1.33
	1553	2.55	1.50
	1606	.55	1.62
	1611	.60	1.67
	1711	.10	1.77
	4 RG	AVG	1.72

Event of July 27, 1964

4 RG	6-30	.06	.00	7-27	RG	B-36-R	7-27	0304	T	.0000
	7-1	.38	T		0228	.00		0310	.0141	.0007
	7-7	.28	T		0243	.28		0315	.0276	.0024
	7-8	.14	T		0255	.55		0330	.0476	.0118
	7-10	.50	.01		0302	1.46		0340	.1540	.0286
					0326	.83				
	7-11	.11	T		0332	3.50	1.03	0345	.2140	.0440
	7-26	1.26	.16		0335	2.20	1.14	0350	.2310	.0625
	7-27	.00	T		0345	.78	1.27	0400	.1730	.0962
					0532	.00	1.27	0415	.2350	.1472
					0547	.72	1.45	0420	.2350	.1668

Watershed conditions:
Watershed predominantly in
straight row farming. Cracks
from a few inches to 2 to 3'
deep appearing in some fields.
Corn: Poor condition.
Ground cover 40%. Last culti-
vation July 5 and 6.
Milo: Good field cover and
mile 12% headed out. Ground
cover 50%. Last cultivation
July 15th to 20th.
Wheat: Harvested, stubble
6" to 10" tall. Ground cover
75% to 90%.
Fallow: Fields all worked
July 12 to 22 with disk or
spring tooth tillers.
Pasture: Overgrazed.
Meadow: Grass heading out;
good condition. 75% estimated
cover.
(Continued on next page)

Continued on next page

SELECTED RUNOFF EVENTS

A43

WATERSHED W-3 (44.01)

ANTECEDENT CONDITION			RAINFALL			RUNOFF		
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time
							Rate (in/hr)	Acc. (in.)
<u>Event of July 27, 1964 - Continued</u>								
Watershed conditions: (Continued)			7-27	RG	B-10-R			
Sudan - Grazed short; in fair to good condition.				0232	.00	.00		
25% cover.				0247	.36	.09		
Land use in percentage of the watershed was as follows:				0306	.32	.13		
Corn 3%				0330	.48	.38		
Milo 27%				0338	2.70	.74		
Wheat 23%								
Fallow 18%				0346	.60	.82		
Pasture 19%				0416	.08	.86		
Meadow 2%				0538	.00	.86		
Sudan 5%				0550	.50	.96		
Farm Yard 1%				0600	.12	.98		
Roads 2%								
				RG	B-31-R			
				0244	.00	.00		
				0258	.17	.04		
				0314	.26	.11		
				0330	.57	.26		
				0340	.60	.36		
				0343	4.20	.57		
				0350	1.71	.77		
				0358	.83	.88		
				0548	.00	.88		
				0557	1.07	1.04		
				0804	.00	1.07		
				4 RG	AVG	1.19		

Event of June 12-13, 1965

	RG	B-36-R		RG	B-36-R			
5-14	.71	.0155	6-12	2116	.00	6-12	2120	.0000
5-15	.00	.0071		2129	2.77		2130	.0009
5-17	.20	.0000		2139	.24		2135	.0032
5-21	3.36	1.6299		2149	.84		2145	.0012
5-22	4.08	3.1914		2159	.12		2200	.0003
5-24	1.14	.5992		2334	.00		2215	.0003
5-25	.15	.0000		2347	.83		2230	.0011
5-26	.00	.0362		2357	4.20		2245	.0069
5-31	.07	.0000	6-13	0004	1.54		2300	.0206
6-1	1.02	.1414		0147	.04		2320	.0509
6-2	.10	.3175		RG	B-10-R		2340	.0928
6-5	.32	.0028	6-12	2111	.00		2350	.1090
6-6	.12	.0019		2131	2.49		2400	.3960
6-9	.78	.1036		2151	.36		0010	.6890
6-10	.41	.1616		2221	.04		0020	.7960
				2339	.00			
6-11	.09	.0081					0030	.6800
				2400	.91		0050	.4120
Watershed conditions:			6-13	0015	1.20		0110	.2190
Watershed predominately in straight farming.				0145	.03		0130	.1350
Corn: 6" to 3' high in good condition.				0255	.03		0200	.0695
Sorghum: 1" to 6" high in good condition.				RG	A-12-R		0230	.0419
Wheat: 2' to 3' high, ripe, in poor condition. Ground cover 60%.				RG	B-31-R	2.21	0300	.0187
Pasture: 3" to 6" high in good condition.						1.81	0400	.0066
Meadow: 10" to 20" high, in good condition. Ground cover 85%.							0500	.0028
The land use in percentage of the watershed area was as follows:							0700	.0008
Corn 4%							1000	.0002
Sorghum 18%							1800	.0000
Wheat 19%								.8907
Fallow 28%								.8915
Sweet Clover 2%								
Pasture 18%								
Meadow 2%								
Sudan 6%								
Farm Yard 1%								
Roads 2%								

SELECTED RUNOFF EVENTS

A44

WATERSHED W-3 (44.01)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
Event of June 29-30, 1965										
RG B-36-R			RG		B-36-R					
5-31	.07	.0000	6-29	2235	.00	.00	6-29	2235	.0000	.0000
6-1	1.02	.1414		2240	4.92	.41		2250	.0187	.0023
6-2	.10	.3175		2248	2.03	.68		2300	.0612	.0090
6-5	.32	.0028		2255	.34	.72		2310	.1470	.0263
6-6	.12	.0019						2315	.2190	.0416
			RG		B-10-R					
6-9	.78	.1036		2236	.00	.00		2320	.3130	.0638
6-10	.41	.1616		2241	1.44	.12		2325	.3880	.0930
6-11	.09	.0081		2251	3.66	.73		2330	.4040	.1260
6-12	1.80	.0909		2256	.84	.80		2335	.3880	.1591
6-13	.13	.8006						2345	.3130	.2175
			RG		A-12-R					
6-21	.37	.0000				.71		2400	.1930	.2087
6-22	.21	T	RG		B-31-R		6-30	0030	.0829	.3497
6-24	.39	.0005				.74		0100	.0289	.3776
6-25	.22	.0504						0130	.0114	.3877
6-26	.31	.0286						0230	.0029	.3849
								0400	.0007	.3976
6-28	.39	.0183						0800	.0001	.3992
								1200	.0000	.3994
tershed conditions:										

Watershed conditions:
 Watershed predominantly in
 straight farming.
 Corn: 6" to 3' high in
 good condition.
 Sorghum: 1" to 6" high
 in good condition.
 Wheat: 2' to 3' high,
 ripe, in poor condition.
 Ground cover 60%.
 Pasture: 3" to 6" high in
 good condition.
 Meadow: 10" to 20" high,
 in good condition. Ground
 cover 85%.
 The land use in percentage
 of the watershed area was as
 follows:

Corn 4%
 Sorghum 18%
 Wheat 19%
 Fallow 28%
 Sweet Clover 2%
 Pasture 18%
 Meadow 2%
 Sudan 6%
 Farm Yard 1%
 Roads 2%

Event of July 8, 1967

RG B-36-R				RG B-36-R						
6-9	.43	.0178	7-8	0148	.00	.00	7-8	0143	.0000	.0000
6-10	1.11	.0433		0155	1.71	.20		0242	.0007	.0002
6-11	.90	.3731		0201	2.50	.45		0308	.0177	.0036
6-15	.18	.0093		0210	1.13	.62		0314	.0501	.0070
6-20	.35	.0000		0215	.48	.66		0321	.1240	.0179
6-21	1.11	.2050		0220	1.56	.79		0324	.1250	.0241
6-23	.15	.0086		0230	.12	.81		0330	.1110	.0359
6-24	.55	.1007		0250	.00	.81		0340	.0817	.0519
6-28	.16	.0000		0305	2.68	1.48		0400	.0361	.0707
7-4	.04	.0000		0320	1.20	1.78		0420	.0420	.0832
7-5	.06	.0000		0400	.03	1.80		0435	.0394	.0931
				0430	.20	1.90		0500	.0435	.1108
				0500	.06	1.93		0515	.0410	.1213
				0530	.24	2.05		0540	.0313	.1364
				0640	.02	2.07		0630	.0145	.1555
Watershed conditions: The land use in percentage of the watershed area was as follows:										
				RG	A-12-R			0730	.0045	.1650
Sorghum	22%			0154	.00	.00		0830	.0021	.1683
Wheat	23%			0212	.47	.14		1000	.0009	.1705
Fallow	11%			0220	1.35	.32		1200	.0003	.1717
Alfalfa	5%			0250	.02	.33		1600	.0001	.1725
Pasture	20%			0310	1.14	.71				
Meadow	13%									
Sudan	2%			0320	.42	.78		2400	.0000	.1729
Farm Yard	2%			0400	.03	.80				
Roads	2%			0420	.33	.91				
				0520	.15	1.06				
				0640	.02	1.08				
				RG	B-10-R					
						1.08				
				RG	B-31-R					
						1.99				

SELECTED RUNOFF EVENTS

A45

WATERSHED W-5 (44.02)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
<u>Event of May 29-30, 1957</u>										
4-30	.24	.00	5-29	RG	C-45-R		5-29	1620	.0000	.0000
5-1	1.38	.30		1617	.00	.00		1626	.0111	.0003
5-9	1.65	.13		1622	1.92	.16		1632	.0468	.0028
5-12	.41	.01		1627	.60	.21		1638	.159	.0135
5-14	1.58	.40		1634	3.17	.58		1644	.159	.0294
				1637	2.20	.69				
5-16	.94	.12		1647	1.14	.88		1650	.143	.0445
				1652	.36	.91		1710	.0668	.0788
				1812	.04	.96		1740	.0328	.1030
Watershed conditions: Corn just planted, wheat was heading out and about 36" high and in excellent condition. Sorghum just planted; pasture in excellent condition about 10" high. Meadow about 12" high, heading out and in excellent condition. Alfalfa in good condition and ready to cut. 90% of cultivation on the contour; 10% straight row. The land use in percentage of the watershed area was as follows:				RG	D-45-R		1800	.0204	.1215	
				1610	.00	.00		1823	.0111	.1300
				1616	.50	.05				
				1619	1.60	.13	5-30	1930	.0052	.1354
				1624	4.80	.53		1200	.0000	.1469
				1626	6.30	.74				
				1630	3.60	.98				
				1634	2.10	1.12				
				1638	1.05	1.19				
	1754	.06	1.26							
				RG	D-50-R					
				1616	.00	.00				
				1624	.37	.05				
				1627	3.00	.20				
				1632	6.36	.73				
				1634	5.10	.90				
				1636	3.90	1.03				
				1644	1.88	1.28				
				1658	.30	1.35				
				1718	.09	1.38				
Corn	6.0%									
Oats	1.0%									
Wheat	5.5%									
Fallow	23.5%									
Sorghum	25.0%									
Alfalfa	7.0%									
Sweet Clover	2.0%									
Sudan . . . . .	.5%								
Brome	7.0%									
Pasture	10.0%									
Meadow	9.5%									
Roads . . . . .	.5%								
Farmsteads	2.5%									

Event of June 15, 1957

5-15	.93	.12	6-15	RG	C-45-R		6-15	1120	.0000	.0000
5-29	1.11	.15		1108	.00	.00		1122	.0014	T
5-31	.36	.03		1111	1.80	.09		1130	.0335	.0026
6-6	.10	.00		1113	3.60	.21		1140	.0635	.0107
6-10	.54	.00		1116	2.00	.31		1155	.0656	.0268
				1128	1.60	.63				
6-14	.93	.03		1132	.75	.68		1200	.0591	.0320
				1135	2.20	.79		1204	.0591	.0360
Watershed conditions: The				1152	.46	.92		1220	.203	.0693
wheat was fully headed, about				1154	1.50	.97		1230	.244	.1065
4' high and in excellent con-				1156	3.90	1.10		1245	.270	.1708
dition. The sorghum was not										
out of the ground. Pasture				1200	2.10	1.24		1255	.270	.2158
was in excellent condition at				1204	1.50	1.34		1300	.223	.2363
a height of 12". Meadow was				1208	.45	1.37		1320	.114	.2925
in excellent condition, head-				1318	.03	1.40		1340	.0668	.3227
ing out, at about 14" in								1400	.0451	.3413
height. About 90% of cultiva-				RG	D-45-R					
tion was contour and 10%				1102	.00	.00		1430	.0277	.3595
straight row. The land use				1111	.20	.03		1600	.0087	.3845
in percentage of the watershed				1115	2.40	.19		1710	.0055	.3927
area was as follows:				1130	1.50	.55				
Corn				1135	.48	.59				
Oats										
Wheat				1138	2.20	.70				
Fallow				1147	.67	.80				
Sorghum				1157	.06	.81				
Alfalfa				1208	1.42	1.07				
Sweet Clover				1308	.01	1.08				
Sudan				RG	D-50-R					
Brome				1040	.00	.00				
Pasture				1009	.10	.05				
Meadow				1012	1.40	.12				
Roads				1014	3.90	.25				
Farmsteads				1016	.60	.27				
				1029	1.85	.67				
				1033	.45	.70				
				1037	1.80	.82				
				1041	.45	.85				
				1045	1.05	.92				
				1055	.12	.94				
				1058	3.40	1.11				
				1203	1.68	1.25				
				1208	.60	1.30				
				1408	.01	1.32				

SELECTED RUNOFF EVENTS

WATERSHED W-5 (44.02)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
Event of June 12, 1958										
				RG	C-45-R					
5-14	.17	.00	6-12	0150	.00	.00	6-12	0156	.0000	.0000
5-16	.40	.00		0154	.60	.04		0206	.0003	T
5-16	.20	.00		0200	1.20	.16		0208	.0111	.0002
5-19	.10	.00		0204	2.55	.33		0212	.114	.0047
5-26	.31	.00		0206	4.80	.49		0220	.203	.0270
Watershed conditions: Corn				0211	10.44	1.36		0234	.130	.0659
was 6" high, poor stand;				0216	3.96	1.69		0242	.171	.0859
wheat, 4' high, turning and				0221	2.76	1.92		0250	.282	.1169
in excellent condition.				0237	.45	2.04		0256	.323	.1472
Sorghum planted about June 1.				0249	.00	2.04		0304	.290	.1881
Meadow in good condition.										
Pasture 6" high and in good				0310	.54	2.23		0320	.159	.2478
condition. Summer fallow				0443	.00	2.23		0330	.101	.2694
ground all worked within				0448	.24	2.25		0342	.0729	.2868
two weeks preceding June 12th								0420	.0306	.3189
storm. The land use in per-				RG	D-45-R			0500	.0119	.3331
centage of the watershed area				0148	.00	.00				
was as follows:				0200	.50	.10		0542	.0052	.3391
				0206	2.70	.37		1508	.0000	.3470
Corn	9.5%			0216	6.72	1.49				
Oats	3.0%			0220	2.85	1.68				
Wheat	19.0%									
Fallow	9.0%			0234	.94	1.90				
Sorghum	13.5%			0248	.00	1.90				
Alfalfa	11.0%			0307	.54	2.07				
Sudan	5.0%			0446	.00	2.07				
Pasture	14.0%			0448	2.10	2.14				
Meadow	17.0%									
Roads	5.0%			RG	D-50-R					
Farmsteads	3.0%			0156	.00	.00				
				0200	1.20	.08				
				0206	2.20	.30				
				0213	6.86	1.10				
				0220	4.46	1.62				
				0230	1.08	1.80				
				0302	.39	2.01				
				0308	.90	2.10				
				0444	.00	2.10				
				0448	.30	2.12				
				0924	.00	2.12				
				0928	.30	2.14				
Event of July 3-5, 1959										
				RG	C-45-R					
6-18	T	.00	7-3	2031	.00	.00	7-3	2036	.0000	.0000
6-19	.54	.00		2035	3.45	.23		2040	.0002	T
6-20	1.40	.18		2039	5.40	.59		2050	.145	.0131
6-28	1.85	.40		2041	4.50	.74		2054	.171	.0237
6-29	.25	.01		2045	2.40	.90		2108	.199	.0673
6-30	.29	.02								
				2051	1.70	1.07		2112	.244	.0816
				2053	2.40	1.15		2124	1.05	.2255
				2055	3.00	1.25		2134	1.15	.4098
				2103	1.35	1.43		2138	1.15	.4864
				2113	3.42	2.00		2144	1.13	.6004
				2115	2.40	2.08		2229	.314	1.1377
				2120	.24	2.10		2244	.194	1.1999
				2130	.06	2.11		2314	.0820	1.2662
								2400	.0335	1.3076
				RG	D-45-R		7-4	0020	.0239	1.3172
				2030	.00	.00				
				2035	.84	.07		0230	.0052	1.3433
				2037	4.20	.21		2230	T	1.3583
				2043	5.40	.75	7-5	0600	.0000	1.3583
				2047	3.60	.99				
				2058	2.56	1.46				
				2102	1.50	1.56				
				2117	3.20	2.36				
				2121	.75	2.41				
				2141	.15	2.46				
				RG	D-50-R					
					NR	2.00				
Corn	5.5%									
Oats	2.0%									
Wheat	18.0%									
Fallow	12.0%									
Sorghum	17.0%									
Alfalfa	7.0%									
Sudan	1.0%									
Pasture	13.0%									
Meadow	21.0%									
Roads	1.0%									
Farmsteads	2.5%									

SELECTED RUNOFF EVENTS

WATERSHED W-5 (44.02)

ANTECEDENT CONDITION			RAINFALL			RUNOFF				
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
<u>Event of May 15-17, 1960</u>										
4-16	.20	.00	5-15	RG	C-45-R	.00	5-15	2154	.0000	.0000
4-25	.17	.00		2052	.00	.16		2202	.0487	.0013
4-27	.04	.00		2056	2.40	.26		2208	.0705	.0079
4-28	.13	.00		2138	.14	.82		2211	.241	.0165
4-29	.37	.00		2155	1.97	1.44		2214	.229	.0283
				2204	4.13					
5-3	.10	.00		2224	1.95	2.09		2220	.201	.0494
5-5	1.90	.18		2236	.35	2.16		2228	.270	.0775
5-6	.17	T						2232	.323	.0972
Watershed conditions: Crops				RG	D-45-R			2236	.562	.1285
in following condition:				2054	.00	.00		2238	.615	.1481
Corn - some planted				2100	1.50	.15				
Wheat - some 12" tall, excel-				2138	.08	.20		2243	.630	.2005
lent				2144	.90	.29		2248	.644	.2530
Oats - 4" tall, good condition				2207	2.84	1.38		2258	.644	.3603
Sorghum - just planted								2303	.630	.4115
Alfalfa - about 10" tall, good				2228	1.88	2.04		2308	.586	.4627
Meadow - 4" tall, good				2242	.43	2.14				
Pasture - 2" tall, fair								2313	.524	.5090
Ground was too wet for good				RG	D-50-R			2322	.323	.5724
tillage. Pasture and meadow				2052	.00	.00		2328	.253	.6012
with fair ground cover.				2102	.96	.16		2338	.185	.6377
Watershed predominantly in				2138	.07	.20		2348	.143	.6650
terraced and contour farming.				2150	1.10	.42				
The land use in percentage of				2154	4.20	.70		2400	.0980	.6891
the watershed area was as							5-16	0018	.0680	.7139
follows:				2200	1.70	.87		0038	.0468	.7330
Sorghum				2208	4.35	1.45		0108	.0292	.7526
Wheat				2220	1.15	1.68		0138	.0193	.7641
Meadow				2228	3.08	2.09				
Pasture				2240	.45	2.18		5-17	0600	.0000
Alfalfa . . . . .										.8045
Fallow										
Corn				2300	.09	2.21				
Farmsteads										
Roads										
Sudan										
Thiessen weighted average						2.17				

Event of June 14-15, 1961

5-16	.15	.00	6-14	RG	C-45-R	.00	6-15	0020	.0000	.0000
5-17	.69	T		2345		.24		0036	.0136	.0011
5-19	.55	.01	6-15	0010		.08		0045	.0381	.0056
5-20	.27	T		0019		.60		0050	.0569	.0089
5-21	2.04	.13		0029		.90		0056	.0680	.0153
5-22	1.11	.10		0041		1.35		0058	.135	.0187
5-23	.00	.24		0105		.95		0104	.147	.0328
5-30	.04	.00		0110		.48		0110	.141	.0472
5-31	.27	.00		0115		1.68		0120	.141	.0707
6-2	.09	.00		0119		.75		0128	.159	.0899
6-4	.04	.00		0141		.22		0132	.163	.1006
6-5	.53	T		0151		.60		0138	.189	.1182
6-6	.96	T		0157		1.30		0144	.223	.1388
6-7	.00	.01		0209		.60		0154	.244	.1780
6-13	.19	.00		0229		.45		0202	.249	.2100
Watershed conditions: Crops				0259		.20		0214	.244	.2594
in following conditions:				0329		.08		0220	.239	.2835
Corn - just out of ground,				0349		.30		0240	.218	.3597
fair.				0419		.10		0300	.178	.4257
Wheat - 3' tall, heads				1052		.01		0330	.117	.4994
filling, excellent.										
Oats - 2' tall, heading				RG	D-45-R			0400	.0755	.5476
good.			6-14	2353		.00		0430	.0569	.5807
Sorghum - just up, fair.			6-15	0008		.28		0530	.0251	.6217
Alfalfa - first cutting,				0016		1.88		0630	.0111	.6398
good.				0034		.84		1200	.0011	.6595
Meadow - 4" tall, excellent.				0046		1.35				
Pasture - about 6" high, excel-								2340	T	.6669
lent.				0055		3.27				
Cultivation late, due to wet				0058		2.60				
fields. Meadow and pasture				0104		1.10				
with good ground cover. Water-				0120		.60				
shed predominantly in terraced				0132		1.00				
and contour farming. The land										
use in percentage of the water-				0150		.23				
shed area was as follows:				0200		.60				
Sorghum	21.4%			0220		.90				
Meadow	16.7%			0235		.48				
Fallow	12.8%			0301		.09				
Corn	12.3%									
Pasture	12.2%			0307		.40				
Alfalfa	11.3%			0340		.20				
Wheat	9.3%			0400		.33				
Farmsteads	2.8%			0530		.04				
Roads	1.2%									
				RG	D-50-R					
			6-14	2348		.00				
				2352		1.05				
			6-15	0004		.10				
				0013		2.13				
				0030		1.20				
				0047		1.83				
				0054		3.34				
				0103		1.46				
				0118		.76				
				0121		1.60				
				0131		.54				
				0147		.30				
				0203		1.32				
				0218		.88				
				0230		.35				

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SELECTED RUNOFF EVENTS

WATERSHED W-5 (44.02)

ANTECEDENT CONDITION			RAINFALL		RUNOFF					
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)

Event of June 14-15, 1961 - Continued

6-15	0250	.15	3.01
	0400	.13	3.16
	0420	.15	3.21
	0530	.03	3.24
	RG	C-58-R	
	0001	.00	.00
	0007	1.60	.16
	0014	2.40	.44
	0021	.86	.54
	0027	1.50	.69
	0035	.98	.82
	0050	2.24	1.38
	0102	1.00	1.58
	0105	2.00	1.68
	0124	.98	1.99
	0157	.20	2.10
	0213	.68	2.28
	0256	.27	2.47
	0336	.05	2.50
	0354	.30	2.59
	0430	.07	2.63
	0500	.02	2.64

Thiessen weighted average 2.61

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
Event of June 5, 1942										
5-10	.10	.00	6-7	RG	C-31-R		6-7	1652	.0000	.0000
5-17	.46	.00		1652	.00	.00		1720	.014	.0010
5-27	2.29	.420		1656	.75	.05		1736	.089	.0138
6-2	.19	.00		1702	3.00	.35		1750	.242	.0534
6-5	.48	.00		1708	3.20	.67		1800	.264	.0963
				1720	1.55	.98				
Watershed conditions: The corn was about 2" high. The oats 14", wheat 18" and barley 14" high and heading out. The meadow was well covered and about 10" high. The pastures were in good condition with grass about 3" high. Very little sorghum planted to date. Predominantly straight-row farmed. The land use in percentage of the watershed area was as follows:				1726	2.20	1.20		1810	.252	.1393
				1732	1.50	1.35		1830	.205	.2155
				1740	1.12	1.50		1854	.155	.2866
				1756	.52	1.64		1928	.231	.3956
				1812	.41	1.75		1948	.212	.4694
				1818	.50	1.80		2030	.138	.5916
				1830	.10	1.82		2100	.091	.6489
				RG	A-31-R		6-8	0600	.002	.8541
				1711	.00	.00		1800	T	.8626
				1715	1.80	.12	6-9	0600	T	.8644
Corn	28%			1722	.43	.17		2130	.0000	.8644
Sorghum in rows	8%			1727	3.24	.44				
Wheat	18%			1730	2.60	.57				
Oats	8%			1739	1.00	.72				
Barley	5%			1743	1.65	.83				
Pasture	19%			1750	.17	.85				
Roads	2%			1800	.36	.91				
Rye	2%			1850	.02	.93				
Alfalfa	2%			RG	B-28-R					
Fallow	3%			1640	.00	.00				
Meadow	4%			1714	.56	.32				
Farmsteads	1%			1719	2.28	.51				
				1722	4.20	.72				
				1731	2.20	1.05				
				1736	3.12	1.31				
				1750	.73	1.48				
				1800	.24	1.52				
				1850	.04	1.55				
				RG	D-31-R					
				1702	.00	.00				
				1705	1.00	.05				
				1712	1.71	.25				
				1722	1.32	.47				
				1731	2.80	.89				
				1735	3.15	1.10				
				1748	1.34	1.39				
				1856	.13	1.53				

Event of July 10, 1951

			RG	C-31-R						
6-14	.78	.174	7-10	0452	.00	.00	7-10	0607	.0000	.0000
6-18	.12	.003		0456	3.15	.21		0620	.059	.0054
6-21	.49	.001		0502	1.00	.31		0630	.110	.0187
6-22	.86	.298		0546	.01	.32		0640	.230	.0464
6-26	1.73	.883		0556	.30	.37		0650	.325	.0934
6-27	.09	.00		0602	2.90	.66		0658	.344	.1385
6-29	.02	.00		0610	6.30	1.50		0712	.317	.2160
7-6	.01	.00		0614	4.95	1.83		0730	.264	.3034
				0622	2.48	2.16		0740	.244	.3454
				0630	1.28	2.33		0800	.352	.4454
Watershed conditions: The corn was 20-30" high and in good condition; the oats 16-18" in poor condition and heading out; wheat was 18" to 20" high in fair to good condition; the meadow was 12"-16" high in good condition; and the pasture was in good condition with the grass 4-5" high. Watershed predominantly straight-row farmed. The land use (partly estimated) in percentage of the watershed area was as follows:				0634	3.00	2.53		0816	.321	.5359
				0640	2.90	2.82		0838	.271	.6471
				0650	.96	2.98		0900	.231	.7388
				0656	.20	3.00		0930	.193	.8441
				0712	.22	3.06		1010	.152	.9589
				0812	.02	3.08		1116	.100	1.0941
				1042	.01	3.10		1208	.077	1.1700
				RG	A-31-R			1416	.031	1.2833
				0459	.00	.00		1616	.005	1.3128
				0501	.90	.03		1732	.002	1.3165
Corn	28%			0506	1.92	.19				
Wheat	25%			0510	.15	.20				
Pasture	18%			0542	.00	.20				
Sorghum in rows	1%			0550	.22	.23				
Oats	12%			0554	1.05	.30				
Alfalfa	6%			0610	2.66	1.01				
Fallow	3%			0620	1.86	1.32				
Farmsteads	2%			0632	1.25	1.57				
Meadow	3%			0638	2.10	1.78				
Roads	2%			0648	1.02	1.95				
				0658	.42	2.02				
				0748	.05	2.06				
				1048	T	2.08				
				RG	B-28-R					
				0455	.00	.00				
				0500	2.16	.18				
				0504	.45	.21				
				0546	.03	.23				
				0548	.30	.24				

Continued on next page

SELECTED RUNOFF EVENTS

WATERSHED W-8 (44.03)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)

Event of July 10, 1951 - Continued

7-10	RG		B-28-R							
	0550				1.80	.30				
	0556				1.40	.44				
	0612				4.69	1.69				
	0616				2.70	1.87				
	0630				1.54	2.23				
	0634				3.30	2.45				
	0636				2.70	2.54				
	0646				1.20	2.74				
	0652				.30	2.77				
	0702				.42	2.84				
	0802				.05	2.89				
	RG		D-31-R							
	0451				.00	.00				
	0453				2.70	.09				
	0456				1.00	.14				
	0546				.02	.16				
	0554				.15	.18				
	0600				3.40	.52				
	0606				8.70	1.39				
	0610				5.40	1.75				
	0618				2.62	2.10				
	0626				2.02	2.37				
	0638				3.75	3.12				
	0644				1.40	3.26				
	0654				.54	3.35				
	0710				.30	3.43				
	0730				.06	3.45				
	0735				.24	3.47				
	0745				.12	3.49				
	0915				.01	3.50				
	1130				T	3.51				
	1136				.30	3.54				

Event of June 7, 1953

5-10	.10	.00	6-7	RG	C-31-R							
5-17	.46	.00		1652	.00	.00	6-7	1652	.0000	.0000		
5-27	2.29	.420		1656	.75	.05		1720	.014	.0010		
6-2	.19	.00		1702	3.00	.35		1736	.089	.0138		
6-5	.48	.00		1708	3.20	.67		1750	.242	.0534		
				1720	1.55	.98		1800	.264	.0963		
Watershed conditions: The corn				1726	2.20	1.20		1810	.252	.1393		
was about 7" high, wheat about				1732	1.50	1.35		1830	.205	.2155		
20", oats 12", sorghum 3", mea-				1740	1.12	1.50		1854	.155	.2866		
dow 6", and pasture 3" high.				1756	.52	1.64		1928	.231	.3956		
Crops in fair condition. Corn				1812	.41	1.75		1948	.212	.4694		
was planted about May 15. Water-												
shed predominantly straight-row				1818	.50	1.80		2030	.138	.5916		
farmed. The land use (partly				1830	.10	1.82		2100	.091	.6489		
estimated) in percentage of the								2400	.024	.8174		
watershed area was as follows:				RG	A-31-R		6-8	0600	.002	.8541		
				1651	.00	.00		1800	T	.8626		
Corn 38%				1654	2.20	.11						
Wheat 5%				1659	2.64	.33	6-9	0600	T	.8644		
Pasture 18%				1708	2.66	.73		2130	.0000	.8644		
Sorghum in rows . . 7%				1720	1.35	1.00						
Oats 13%												
Alfalfa 6%				1728	1.28	1.17						
Fallow 6%				1740	1.00	1.37						
Farmsteads 2%				1800	.30	1.47						
Meadow 3%				1816	.30	1.55						
Roads 2%				1822	.30	1.58						
				RG	B-28-R							
				1650	.00	.00						
				1654	1.20	.08						
				1701	2.31	.35						
				1707	3.20	.67						
				1715	1.58	.88						
				1723	1.12	1.03						
				1744	1.00	1.38						
				1800	.34	1.47						
				1816	.38	1.57						
				1836	.06	1.59						
				RG	D-31-R							
Total						2.04						

SELECTED RUNOFF EVENTS

A51

WATERSHED W-8 (44.03)

ANTECEDENT CONDITION			RAINFALL				RUNOFF				
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	
Event of August 28, 1957											
8-2	.75	.00	8-28	RG 2353	D-31-R .00	.00	8-29	0007	.0000	.0000	
8-16	2.22	.073		2359	.50	.05		0040	.010	.0021	
8-23	.01	.00	8-29	0005	1.40	.19		0103	.060	.0156	
8-27	.09	.00		0011	1.90	.38		0130	.115	.0547	
				0013	7.50	.63		0200	.198	.1365	
Watershed conditions: Wheat and oats harvested; sorghum 3-5' high and headed; corn badly damaged by grasshoppers, in dented stages; meadow, recently cut, 4" high and in good condition; pastures 6" high and in good condition. Watershed predominantly straight-row farmed. The land use in percentage of the watershed area was as follows:				0021	4.65	1.25	0230	.217	.2411		
				0027	4.70	1.72		0300	.201	.3462	
				0031	2.40	1.88		0340	.174	.4714	
				0037	1.00	1.98		0356	.170	.5173	
				0047	.96	2.14		0430	.192	.6190	
				0113	.78	2.48		0505	.204	.7357	
				0203	.23	2.67		0600	.184	.9164	
				0403	.10	2.86		0800	.090	1.1888	
				1308	.01	2.92		1200	.007	1.3187	
								1800	.001	1.3345	
Alfalfa 9%				8-28	RG 2358	A-31-R .00	.00	8-30	0600	T 1.3373	
Corn 7%				8-29	0010	.35	.07		2200	.0000 1.3375	
Fallow 14%					0020	1.20	.27				
Farmsteads 2%					0026	2.60	.53				
Meadow 3%					0029	3.60	.71				
Oats 3%											
Pasture 21%					0039	1.02	.88				
Roads 2%					0046	1.20	1.02				
Sorghum drilled . . . 1%					0100	.77	1.20				
Sorghum in rows . . . 26%					0110	1.62	1.47				
Sweet Clover 1%					0130	1.50	1.97				
Wheat 11%											
				0230	.14	2.11					
				0830	T	2.13					
				1000	.02	2.15					
			8-28	RG 2350	B-32-R .00	.00					
			8-29	0003	.37	.08					
				0014	.76	.22					
				0028	2.57	.82					
				0043	.76	1.01					
				0056	1.01	1.23					
				0109	1.06	1.45					
				0132	1.17	1.90					
				0302	.09	2.04					
				0900	.00	2.04					
				1130	.01	2.07					
			8-28	RG Total	C-31-R	2.50					
Event of June 12, 1958											
5-14	.35	.00	6-12	RG 0154	C-31-R .00	.00	6-12	0216	.0000	.0000	
5-15	.29	.00		0200	.60	.06		0230	.0012	.0001	
5-16	.27	T		0205	1.68	.20		0240	.0082	.0006	
5-26	.28	.00		0208	4.00	.40		0245	.0362	.0026	
5-27	.14	.00		0212	7.50	.90		0249	.0491	.0055	
6-6	.12	.00		0214	5.70	1.09		0302	.0812	.0199	
Watershed conditions:					0220	3.20	1.41		0320	.126	.0516
Corn - 6" high, poor stand					0224	1.50	1.51		0326	.134	.0646
Wheat - 4' high, excellent condition					0230	.40	1.55		0333	.136	.0803
					0250	.18	1.61		0342	.133	.1005
Oats - 2' high, good condition					0305	.56	1.75		0410	.0983	.1552
Pasture - 6" high, good condition					0309	1.05	1.82		0430	.0694	.1831
Sorghum - 2" high, poor stand					0448	.01	1.83		0441	.0522	.1943
Alfalfa - cut, excellent condition					0450	.60	1.85		0501	.0320	.2079
								0536	.0213	.2226	
Meadow - 10" high, good condition				RG A-31-R							
Pasture - 6" high, good condition					0158	.00	.00		0620	.0179	.2367
					0210	3.70	.74		0701	.0269	.2508
					0213	4.00	.94		0728	.0392	.2657
Fields in corn and sorghum worked between May 14 and June 1. All corn planted by June 1, all sorghum planted by June 12. Watershed predominantly straight row farmed. The land use (partly estimated) in percentage of the watershed area was as follows:					0222	1.87	1.22		0813	.0495	.3000
				0232	.36	1.28		0825	.0495	.3099	
				0256	.05	1.30		0906	.0407	.3415	
				0308	.25	1.35		1006	.0166	.3693	
				0311	1.80	1.44		1106	.0044	.3775	
				0316	.48	1.48		1306	.0016	.3827	
				0446	.00	1.48		2355	.0002	.3884	
Corn 11%					0449	.60	1.51				
Wheat 14%				RG B-32-R							
Oats 1%					0154	.00	.00				
Sorghum in rows . . . 15%					0200	1.00	.10				
Fallow 19%					0204	2.85	.29				
Sudan 1%					0208	4.80	.61				
Alfalfa 9%											
Clover 2%											
Meadow 3%											
Pasture 21%											
Farmsteads 2%											
Roads 2%											

SELECTED RUNOFF EVENTS

WATERSHED W-8 (44.03)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
<u>Event of July 3-6, 1959</u>										
6-18	.03	.00	7-3	RG	C-31-R		7-3	2035	.0000	.0000
6-19	.55	T		2032	.00	.00		2052	.0077	.0005
6-21	1.36	.22		2036	2.55	.17		2116	.142	.0309
6-28	1.83	.53		2041	6.12	.68		2120	.178	.0416
6-30	.43	.03		2046	3.96	1.01		2132	.316	.0908
				2050	1.65	1.12				
Watershed conditions:				2054	3.60	1.36		2136	.332	.1124
Corn - 1' high, thin stand,				2106	1.95	1.75		2140	.342	.1348
poor condition.				2110	5.70	2.13		2148	.326	.1795
Wheat - 3 - 4' high, ripe,				2114	4.35	2.42		2158	.290	.2305
good condition.				2118	1.20	2.50		2200	.309	.2406
Sorghum - 6" high, good				2122	.45	2.53		2208	.473	.2934
stand.			7-4	1200	T	2.57		2212	.501	.3259
Oats - 2' high, thin stand.								2214	.510	.3427
Alfalfa - first cutting up;				RG	A-31-R			2218	.601	.3764
2nd growth about 4" high.			7-3	2031	.00	.00		2228	.465	.4571
Fallow - ground bare, loose				2040	6.47	.97				
and rough.				2044	4.20	1.25		2252	.249	.6197
Meadow - 8" high, good con-				2049	2.64	1.47		2324	.217	.7691
dition. Most of fallow				2052	1.40	1.54		2340	.166	.8216
ground had been plowed be-				2102	2.34	1.93	7-4	0020	.126	.9165
fore the storm. The water-				2113	1.80	2.26		0040	.117	.9570
shed is predominantly				2117	.75	2.31		0300	.0703	1.1758
straight-row farmed. The				2137	.06	2.33		0340	.0443	1.2149
land use (partly estimated)								0440	.0189	1.2442
in percentage of the water-				RG	B-32-R	.00		0520	.0110	1.2541
shed area was as follows:				2032	.00	.00		1100	.0010	1.2721
Corn 10%				2044	5.75	1.15		2400	.0001	1.2763
Oats 1%				2102	2.13	1.79		1200	T	1.2773
Wheat 24%				2106	2.70	1.97	7-5	2359	.0000	1.2773
Fallow 13%				2110	3.75	2.22	7-6			
Sorghum 17%										
Meadow 3%				2114	2.70	2.40				
Alfalfa 6%				2117	.80	2.44				
Sudan 1%				2125	.15	2.46				
Pasture 21%			7-4	1500	T	2.48				
Farmsteads 2%										
Roads 2%				RG	D-31-R					
Most of the fallow ground had			7-3	Total	NR	2.36				
been plowed before the storm.										

Event of May 15-17, 1960

4-17	.20	.00	5-15	RG	C-31-R	.00	5-15	2200	.0000	.0000
4-25	.10	.00		2053	.00	.00		2212	.0428	.0024
4-27	.05	.00		2059	1.50	.15		2220	.0998	.0126
4-28	.10	.00		2140	.13	.24		2236	.178	.0460
4-29	.33	.00		2155	2.24	.80		2248	.222	.0871
				2207	3.85	1.57				
5-3	.13	.00		2213	.50	1.62		2304	.188	.1425
5-5	1.55	.09		2227	2.83	2.28		2320	.160	.1883
5-6	.11	T		2247	.15	2.33		2332	.204	.2229
Watershed conditions: Crops								2344	.266	.2723
in following condition:				RG	A-31-R	.00		2400	.227	.3384
Corn - some planted				2056	.00	.00				
Wheat - 12" tall, excellent				2106	.36	.10	5-16	0020	.183	.4066
Oats - 4" tall, good condition				2114	.60	.14		0040	.157	.4633
Sorghum - some planted				2142	.40	.19		0100	.136	.5121
Alfalfa - 10" tall, good				2156	2.14	.69		0140	.111	.5946
Meadow - 4" tall, good								0208	.0898	.6414
Pasture - 2" tall, fair condi-				2210	3.81	1.58		0224	.0651	.6622
tion				2220	.84	1.72		0232	.0548	.6702
Ground was too wet for good				2232	2.70	2.26		0248	.0407	.6829
tillage. Pasture and meadow				2238	.01	2.28		0300	.0302	.6902
with fair ground cover. Water-				RG	A-32-R	.00		0348	.0135	.7075
shed predominantly in straight-				2057	.00	.00		0448	.0053	.7160
row farming. The land use				2101	1.05	.07		0640	.0019	.7217
(partially estimated) in per-				2113	.40	.15	5-17	0600	.0000	.7287
centage of the watershed area				2145	.19	.25				
was as follows:				2155	2.76	.71				
Sorghum 29.2%				2200	1.56	.84				
Pasture 20.3%				2208	5.03	1.51				
Fallow 15.0%				2215	1.12	1.64				
Wheat 13.5%				2229	2.18	2.15				
Corn 10.1%				2243	.30	2.22				
Alfalfa 5.4%										
Meadow 1.9%				RG	D-31-R	.00				
Roads 1.9%				2050	.00	.00				
Sudan 1.5%				2109	.50	.10				
Farmsteads 1.2%				2137	.07	.14				
				2149	1.80	.50				
				2205	5.22	1.89				
				2214	1.27	2.08				
				2224	3.30	2.63				
				2250	.23	2.73				

Thiessen weighted average 2.35

SELECTED RUNOFF EVENTS

WATERSHED W-8 (44.03)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
Event of June 14-15, 1961										
5-16	.12	.00	6-14	RG	C-31-R		6-15	0020	.0000	.0000
5-17	.69	.01	6-15	2354	.00	.00		0112	.0058	.0011
5-18	.00	T		0018	.13	.05		0134	.0126	.0044
5-19	.54	.03		0028	.90	.20		0148	.0186	.0078
5-20	.29	.02		0040	1.25	.45		0200	.0348	.0132
				0051	.66	.57				
5-21	1.90	.39		0106	.36	.66		0210	.0479	.0206
5-22	1.11	.58		0116	.66	.77		0214	.0537	.0236
5-23	.00	T		0121	1.92	.93		0230	.0784	.0412
5-30	.08	.00		0125	.75	.98		0240	.0898	.0552
5-31	.15	.00		0140	.32	1.06		0254	.0960	.0769
6-2	.08	.00		0150	1.08	1.24		0333	.0760	.1226
6-4	.03	.00		0210	1.08	1.60		0410	.0496	.1722
6-5	.45	T		0216	.60	1.66		0430	.0443	.1878
6-6	.81	T		0256	.23	1.81		0448	.0433	.2009
6-7	.09	.01		0306	.48	1.89		0500	.0459	.2099
6-8	.00	.02		0421	.20	2.14		0530	.0656	.2377
6-13	.32	T		0551	.01	2.16		0552	.0779	.2640
6-14	.00	T						0620	.0808	.3011
								0652	.0774	.3433
								0752	.0548	.4094
Watershed conditions:			6-14	RG	A-31-R					
Crops in following con-				2258	.00	.00				
dition:				2347	.05	.04				
Corn - just out of ground,			6-15	2357	.84	.18		0944	.0135	.4710
fair				0010	.00	.18		0953	.0110	.4729
				0017	.94	.29		1000	.0095	.4741
Wheat - 3' tall, heads								1032	.0061	.4782
filling, excellent				0028	.22	.33		1122	.0036	.4823
Oats - 2' tall, heading				0032	.45	.36				
good				0048	.08	.38		1300	.0019	.4868
Sorghum - just up, fair				0104	.71	.57		1500	.0010	.4897
Alfalfa - first cutting,				0114	.18	.60		1900	.0004	.4921
good								2052	.0003	.4927
Meadow - 4" tall, excellent				0129	.44	.71				
Pasture - 6" tall, excellent				0135	1.00	.81				
Wet fields caused late culti-				0150	.24	.87				
vation. Ground cover on meadow				0207	.11	.92				
and pasture was good. Water-				0214	.43	.97				
shed predominantly in straight-										
row farming. The land use				0239	.60	1.22				
(partly estimated) in percentage				0250	.27	1.27				
of the watershed area was as				0318	.17	1.35				
follows:				0340	.11	1.39				
				0450	.01	1.40				
Fallow	21.8%									
Pasture	20.4%			RG	B-32-R					
Sorghum	18.6%		6-14	2308	.00	.00				
Wheat	16.7%			2400	.10	.09				
Corn	6.4%		6-15	0009	.00	.09				
Alfalfa	5.8%			0014	.24	.11				
Oats	3.7%			0021	.86	.21				
Meadow	2.6%									
Roads	1.9%			0032	.33	.27				
Farmsteads	1.1%			0047	.08	.29				
Sudan	1.0%			0100	.74	.45				
				0103	.60	.48				
				0108	1.80	.63				
				0114	.90	.72				
				0130	.26	.79				
				0145	.80	.99				
				0205	.33	1.10				
				0215	.36	1.16				
			6-15	RG	B-32-R					
				0230	.96	1.40				
				0240	.84	1.54				
				0245	.48	1.58				
				0320	.20	1.70				
				0350	.08	1.74				
				0420	.08	1.78				
				RG	C-31-R					
6-14			6-14	2354	.00	.00				
6-15			6-15	0018	.13	.05				
				0028	.90	.20				
				0040	1.25	.45				
				0051	.65	.57				
				0106	.36	.66				
				0116	.66	.77				
				0121	1.92	.93				
				0125	.75	.98				
				0140	.32	1.06				
				0150	1.08	1.24				
				0210	1.08	1.60				
				0216	.60	1.66				
				0256	.23	1.81				
				0306	.48	1.89				
				0421	.20	2.14				
				0551	.01	2.16				
			6-14	RG	D-31-R					
				2356	.00	.00				
				2358	1.50	.05				
			6-15	0014	.11	.08				
				0021	1.03	.20				
				0038	.67	.39				

ANTECEDENT CONDITION			RAINFALL				RUNOFF					
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)		
Event of August 23-25, 1962												
7-26	.09	.00	8-23	RG	C-31-R		8-23					
7-27	.64	.03		1925	.00	.00		1940	.0000	.0000		
7-29	.07	.00		1936	.22	.04		2000	.0013	.0003		
8-2	.30	T		1942	3.60	.40		2020	.0784	.0136		
8-4	.35	T		1944	8.70	.69		2040	.1170	.0461		
				1948	5.25	1.04		2100	.1270	.0868		
8-10	.17	.00		1950	9.00	1.34		2120	.0960	.1240		
8-11	.05	.00		1954	3.45	1.57		2200	.0377	.1685		
8-15	.04	.00		1956	4.80	1.73		2240	.0260	.1898		
8-22	.05	.00		2000	2.25	1.88		2300	.0292	.1990		
8-23	.56	.00		2004	.30	1.90		2330	.0684	.2234		
Watershed conditions:					2024	.09	1.93		2400	.0864	.2621	
Corn - 8' high, ears well filled				8-24	2340	.00	1.93	8-24	0030	.0898	.3061	
Wheat - harvested					0022	.18	2.06		0100	.0879	.3505	
Oats - harvested					0032	.66	2.17		0200	.0717	.4303	
Sorghum - 5' tall, good condition					0100	.25	2.29		0300	.0422	.4873	
Alfalfa - 12" high, good condition					0240	.07	2.41			0400	.0243	.5205
Meadow - 18" high, good condition								0500	.0150	.5402		
The land use in percentage of the watershed was as follows:				8-23	RG	A-31-R		0600	.0110	.5532		
Corn 6%					1920	1.00	.00	0800	.0106	.5748		
Sorghum 22%					1924	1.65	.11	0900	.0087	.5844		
Oats 4%					1936	.25	.16		1100	.0038	.5969	
Wheat 17%					1946	3.24	.70		1300	.0017	.6024	
Fallow 16%					1950	1.20	.78		1600	.0007	.6066	
Alfalfa 8%				8-24	2001	2.29	1.20	8-25	2400	.0001	.6084	
Pasture 21%					2006	1.20	1.30		2200	.0000	.6095	
Meadow 2%					2010	.60	1.34					
Sudan 1%					2400	.04	1.36					
Farm Yard 1%					0018	.07	1.38					
Roads 2%					0029	.93	1.55					
Note: Watershed was pre-dominantly farmed in straight rows.					0039	.30	1.60					
					0050	.33	1.66					
					0110	.09	1.69					
					0150	.09	1.75					
					0230	.03	1.77					
				8-23	RG	B-32-R						
					1919	.00	.00					
					1932	.23	.05					
					1937	1.56	.18					
					1948	4.31	.97					
					1953	3.12	1.23					
					2000	2.40	1.51					
					2002	1.80	1.60					
					2010	.51	1.66					
				8-24	2330	.00	1.66					
					0020	.10	1.74					
					0030	.90	1.89					
					0055	.26	2.00					
					0240	.07	2.12					
				8-23	RG	D-31-R						
					1925	.00	.00					
				8-24	0230		2.61					
				4 RG	AVG	2.23						

Event of September 9, 1963

4 RG			9-9	RG	C-31-R		9-9			
8-11	.10	.00		1508	.00	.00		1540	.0028	.0000
8-12	.50	.00		1512	.90	.06		1630	.0249	.0116
8-17	.07	.00		1525	.23	.11		1700	.0922	.0408
8-19	.77	.00		1532	2.31	.38		1750	.0554	.1023
8-23	.18	.00		1537	.48	.42		1850	.1650	.2125
8-27	.06	.00		1542	1.44	.54		1940	.1340	.3371
9-1	1.95	.03		1544	6.30	.75		2100	.0608	.4670
9-4	.38	.02		1546	2.40	.83		2200	.0264	.5106
9-7	.08	.00		1554	.45	.89		2400	.0095	.5465
9-9	.60	.01		1605	.71	1.02	9-10	0130	.0044	.5569
Watershed conditions:				1705	.04	1.06				
Sorghum: Approximately 5-6' high and mature, some extra growth prior to selected event due to rainfall in early Sept. Last cultivation July 10-20 with row crop cultivator.				RG	A-12-R					
Wheat: Approximately one-half of wheat stubble was disked or plowed by August 15th; balance idle.				1518	.00	.00				
Fallow: Cultivated from August 20 to 30 with surface type equipment; soil very dry.				1522	3.15	.21				
Alfalfa: Small amount of growth from second cutting, July 20, to Sept. 9.				1525	.40	.23				
Pasture: Grass 1-4" high brown from drought and overgrazed.				1527	2.70	.32				
				1530	2.00	.42				
				1534	1.20	.50				
				1540	2.20	.71				
				1543	.80	.75				
				1547	1.65	.86				
				1551	5.40	1.22				
				1556	3.00	1.47				
				1600	2.40	1.63				
				1607	.34	1.67				
				1616	.27	1.71				
				1640	.05	1.73				
				1720	.06	1.77				
Corn 6%				RG	B-31-R					
Sorghum 27%				1515	.00	.00				
Oats 2%				1711		1.77				
Wheat 14%										
Fallow 13%				RG	D-31-R					
Alfalfa 9%				1520	.00	.00				
Pasture 21%				1725		.99				
Meadow 2%										
Sudan 2%										
Farm Yard 2%				4 RG	AVG	1.40				

SELECTED RUNOFF EVENTS

WATERSHED W-8 (44.03)

ANTECEDENT CONDITION			RAINFALL			RUNOFF				
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
<u>Event of June 11-12, 1964</u>										
5-12	.04	.00	6-11	RG 1808	C-31-R .00	.00	6-11	1840	.0000	.0000
5-15	.05	.00		1819	2.73	.50		1900	.0001	.0001
5-26	.28	.00		1830	.60	.61		1910	.0249	.0021
5-27	.27	.00		1845	2.92	1.34		1930	.0656	.0172
6-3	.05	.00		1851	1.30	1.47		1950	.0893	.0431
6-4	1.07	.00		1907	.68	1.65		2000	.1160	.0602
6-11	.04	.00		1919	.25	1.70		2030	.1390	.1239
				1928	1.46	1.92		2105	.0893	.1925
				1935	2.91	2.26		2200	.1280	.2950
				1957	.38	2.40		2210	.1300	.3165
Watershed conditions:										
Estimated 30% of W-8 area										
had conservation practices,										
such as terraces, contouring										
grassed waterways, etc.										
Corn: 6" to 8" high. Fair										
condition, 6% cover.										
Milo: 2" to 5" high. Fair										
to good condition. 5% cover.										
Wheat: All headed out. 24" to										
40" tall. Some spots of rather										
short growth. 85 to 90% cover.										
Fallow: All fields plowed by										
June 6th some with sweeps of										
disk or spring tooth. 0% cover.										
Alfalfa: 2nd growth coming on										
6" to 10" high, excellent con-										
dition. 75% cover.										
Pastures: Short early grass										
heading out. Some summer										
grasses greening up. Most over-										
grazed. 60% cover.										
Meadow: Fair, summer grasses										
slow starting growth 6" to 12"										
65% cover.										
Sudan: Good, 0" to 4" high.										
Some just planted. 0% to										
6% cover.										
The land use in percentage of										
the watershed area was as follows:										
</										

Watershed conditions:
 Estimated 30% of W-8 area
 had conservation practices,
 such as terraces, contouring
 grassed waterways, etc.
 Corn: 6" to 8" high. Fair
 condition, 6% cover.
 Milo: 2" to 5" high. Fair
 to good condition. 5% cover.
 Wheat: All headed out. 24" to
 40" tall. Some spots of rather
 short growth. 85 to 90% cover.
 Fallow: All fields plowed by
 June 6th some with sweeps of
 disk or spring tooth. 0% cover.
 Alfalfa: 2nd growth coming on
 6" to 10" high, excellent con-
 dition. 75% cover.
 Pastures: Short early grass
 heading out. Some summer
 grasses greening up. Most over-
 grazed. 60% cover.
 Meadow: Fair, summer grasses
 slow starting growth 6" to 12"
 65% cover.
 Sudan: Good, 0" to 4" high.
 Some just planted. 0% to
 6% cover.
 The land use in percentage of
 the watershed area was as follows:

Corn 1%
 Milo 27%
 Oats 1%
 Wheat 17%
 Fallow 17%
 Alfalfa 8%
 Pasture 21%
 Meadow 2%
 Sudan 3%
 Farm Yard 1%
 Roads 2%

Event of June 1-2, 1965

4 RG				RG	C-31-R					
5-4	.46	.0000	6-1	2302	.00	.00	6-1	2303	.0000	.0000
5-5	.13	.0000		2312	.90	.15		2330	.1320	.0330
5-7	.74	.0001		2338	2.49	1.23		2400	.1780	.1105
5-8	.02	.0134		2400	.63	1.46	6-2	0030	.1370	.1892
5-9	.00	.0007	6-2	0008	.38	1.51		0110	.0822	.2623
5-13	.17	.0000		RG	B-31-R			0140	.1150	.3116
5-14	.51	.0003	6-1	2300	.00	.00		0210	.1300	.3728
5-15	.00	.0050		2400	1.11	1.11		0240	.1220	.4358
5-16	.00	.0006	6-2	0006	.50	1.16		0320	.0850	.5048
5-17	.14	.0000						0500	.0236	.5953
5-21	2.97	.2342	6-1	RG	D-31-R			0700	.0041	.6230
5-22	3.52	2.7170		2303	.00	.00		0900	.0015	.6286
5-23	.00	.0038	6-2	0016	.45	1.45		1100	.0009	.6310
5-24	1.06	.5583						2400	.0001	.6375
5-25	.15	.0057		RG	A-12-R	1.16	6-3	2400	.0000	.6387
5-26	.00	.0262								
5-31	.02	.0000								

Watershed conditions:
 Corn: just planted
 Sorghum: 50% planted
 Wheat: 18" to 30" high
 70% headed, in good con-
 dition. Ground cover 85%
 Alfalfa: 24" to 36" high,
 in good condition. Ground
 cover 90%.
 Pasture: 3" to 6" high, in
 good condition.
 Meadow: 6" to 20" high, in
 good condition. Ground cover
 90%.
 The land use in percentage of
 the watershed area was as
 follows:

Corn 1%
 Sorghum 21%
 Wheat 17%
 Fallow 23%
 Alfalfa 8%
 Sweet Clover 1%
 Pasture 21%
 Meadow 2%
 Sudan 3%
 Farm Yard 1%
 Roads 2%

SELECTED RUNOFF EVENTS

A56

WATERSHED W-8 (44.03)

ANTECEDENT CONDITION

RAINFALL

RUNOFF

Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
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Event of June 12-13, 1965

4 RG			RG	C-31-R						
5-13	.17	.0000	6-12	2108	.00	.00	6-12	2100	.0000	.0000
5-14	.51	.0003		2116	2.25	.30		2130	.0571	.0052
5-15	.00	.0050		2126	3.96	.96		2150	.1060	.0347
5-16	.00	.0006		2146	.54	1.14		2220	.0717	.0807
5-17	.14	.0000		2211	.07	1.17		2240	.0571	.1022
5-21	2.97	.2342		2330	.00	1.17		2320	.0627	.1414
5-22	3.52	2.7170		2400	1.16	1.75		2400	.1410	.2114
5-23	.00	.0038	6-13	0155	.08	1.90	6-13	0030	.2110	.3025
5-24	1.06	.5583						0100	.1840	.4025
5-25	.15	.0057						0130	.1540	.4870
5-26	.00	.0262	6-12	2116	.00	.00		0150	.1470	.5372
5-30	.02	.0000		2126	3.42	.57		0210	.1570	.5878
6-1	1.25	.1105		2136	1.86	.88		0240	.1830	.6742
6-2	.07	.5270		2146	.18	.91		0320	.1480	.7846
6-3	.00	.0012		2156	.66	1.02		0400	.1080	.8699
6-5	.36	.0216		2256	.02	1.04				
6-6	.10	.0012		2342	.00	1.04		0500	.0554	.9516
6-7	.01	.0000		2352	.72	1.16		0700	.0147	1.0217
6-9	.92	.0738		2357	.96	1.24		0900	.0035	1.0399
6-10	.39	.1957		2400	4.60	1.47		1100	.0015	1.0449
6-11	.09	.0109	6-13	0006	3.90	1.86		1400	.0007	1.0482
6-12	.00	.0028		0016	1.50	2.11		2400	.0001	1.0522
				0026	.36	2.17	6-14	2400	.0000	1.0534
				0201	.07	2.21				

Watershed conditions:

Corn: just planted
Sorghum: 50% planted
Wheat: 20" to 32" high,
headed, in good condition.
Ground cover 85%.
Alfalfa: 24" to 36" high,
in good condition. Ground
cover 90%.
Pasture: 3" to 6" high,
in good condition.
Meadow: 8" to 20" high,
in good condition. Ground
cover 85%.
The land use in percentage
of the watershed area was
as follows:

Corn 1%
Sorghum 21%
Wheat 17%
Fallow 23%
Alfalfa 8%
Sweet Clover 1%
Pasture 21%
Meadow 2%
Sudan 3%
Farm Yard 1%
Roads 2%

Event of July 8, 1967

4 RG			RG	C-31-R						
6-9	.46	.0204	7-8	0144	.00	.00	7-8	0155	.0003	.0000
6-10	1.04	.0542		0204	1.92	.64		0250	.0009	.0005
6-11	.82	.5330		0218	.73	.81		0310	.0041	.0013
6-12	.01	.0564		0250	.02	.82		0330	.0571	.0115
6-13	.00	.0012		0310	3.18	1.88		0355	.0907	.0440
6-15	.15	.0000		0320	.66	1.99		0410	.0746	.0646
6-20	.46	.0000		0630	.09	2.27		0450	.0300	.0995
6-21	1.07	.1607						0510	.0256	.1087
6-22	T	.0015						0540	.0287	.1223
6-23	.23	.0076		RG	A-12-R			0620	.0565	.1498
6-24	.49	.0875		0154	.00	.00				
6-25	.00	.0024		0212	.47	.14		0650	.0679	.1809
6-28	.13	.0000		0220	1.35	.32		0710	.0679	.2035
7-4	.07	.0000		0250	.02	.33		0750	.0571	.2452
7-5	.07	.0000		0310	1.14	.71		0850	.0382	.2928
				0320	.42	.78		1010	.0180	.3303
				0400	.03	.80				
				0420	.33	.91		1140	.0068	.3489
				0520	.15	1.06		1310	.0025	.3559
				0640	.02	1.08		1440	.0015	.3589
								1610	.0009	.3607
								1910	.0004	.3626
				RG	D-31-R					
				0140	.00	.00		2400	.0001	.3638
				0146	.60	.06	7-9	1200	.0000	.3644
				0156	4.92	.88				
				0126	.69	1.11				
				0248	.00	1.11				
				0318	1.40	1.81				
				0630	.08	2.08				
				RG	B-31-R	1.99				

Watershed conditions:
The land use in percentage
of the watershed area was
as follows:

Corn T
Sorghum 28%
Wheat 21%
Fallow 14%
Alfalfa 8%
Pasture 21%
Meadow 5%
Farm Yard 1%
Roads 2%

SELECTED RUNOFF EVENTS

WATERSHED W-11 (44.04)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
5-16	.06	T	Event of June 15-16, 1957							
				RG	D-31-R					
5-16	.06	T	6-15	1106	.00	.00	6-15	1110	.0002	.0000
5-29	.77	.06		1110	3.30	.22		1220	.0009	.0005
5-31	.21	.02		1125	1.60	.62		1330	.0128	.0082
6-6	.08	.00		1129	.30	.64		1430	.0294	.0311
6-10	.55	T		1133	1.80	.76		1530	.0394	.0653
6-14	.89	.03		1151	.37	.87		1630	.0588	.1119
6-15	.00	.01		1200	2.13	1.19		1800	.107	.2356
				1204	.60	1.23		1830	.163	.3031
				1650	.00	1.23		1850	.219	.3668
				1736	.43	1.56		1900	.238	.4049
Watershed conditions:										
Corn - 6" high, poor condition.				1748	1.05	1.77		1932	.240	.5319
Wheat - 4' high, headed and in good condition.				1757	3.27	2.26		2002	.355	.6808
Sorghum - being replanted.				1818	.97	2.60		2033	.375	.8681
Oats - 20" high, good condition.				1829	3.11	3.17		2056	.406	1.0182
Alfalfa - most of it cut, good condition.				1850	1.28	3.62		2116	.415	1.1552
Meadow and pasture - excellent condition.				1950	.54	4.16		2130	.406	1.2510
The corn was all planted by June 1; the fallow ground was plowed and void of cover prior to the storm. Watershed predominantly straight row farmed. The land use in percentage of the watershed area was as follows:				2030	1.56	5.20		2156	.375	1.4198
Corn 5%				2055	.62	5.46		2230	.313	1.6156
Wheat 14%				2306	.29	6.09		2300	.274	1.7263
Oats 2%				2348	.04	6.12	6-16	0030	.219	2.1263
Sorghum in rows . . . 27%			6-16	0010	.30	6.23		0100	.213	2.2343
Fallow 17%				0610	.03	6.40		0200	.171	2.4261
Clover 1%								0330	.147	2.6654
Alfalfa 6%				RG	A-31-R			0530	.0984	2.9081
Pasture 22%			6-15	1058	.00	.00		0630	.0819	2.9982
Meadow 2%				1110	1.50	.30				
Farmsteads 2%				1138	1.59	1.04		0900	.0656	3.1821
Roads 2%				1150	3.30	1.70		1100	.0124	3.2644
				0010	.48	1.86		1400	.0027	3.2812
				1710	T	1.88		2110	.0008	3.2920
				1739	.33	2.04				
				1835	1.21	3.17				
				1940	.38	3.58				
				2034	.86	4.35				
				2139	.03	4.38				
				2158	1.04	4.71				
				2218	.09	4.74				
				2251	1.02	5.30				
				2341	.00	5.30				
				2352	.98	5.48				
			6-16	0900	.02	5.67				
				RG	B-32-R					
			6-15	1051	.00	.00				
				2250		5.51				
			6-16	1250		5.85				
				RG	C-31-R					
			6-15	1106	.00	.00				
				1110	.75	.05				
				1130	2.46	.87				
				1154	.75	1.17				
				1204	2.82	1.64				
				1210	.60	1.70				
				1410	.01	1.72				
				1700	.00	1.72				
				1748	.25	1.92				
				1802	2.19	2.43				
				1822	.87	2.72				
				1854	1.41	3.47				
				1934	.38	3.72				
				1958	1.15	4.18				
				2012	.51	4.30				
				2034	1.91	5.00				
				2130	.15	5.14				
				2158	.00	5.14				
				2210	1.00	5.34				
				2236	.16	5.41				
				2306	.86	5.84				
			6-16	0300	.13	6.12				
				RG	E-30-R					
			6-15	1023	.00	.00				
				2304		5.85				
			6-16	0120		6.05				
				RG	G-42-R					
			6-15	1106	.00	.00				
				1118	.30	.06				
				1142	.98	.45				
				1232	.06	.50				
				1432	.00	.50				
				1532	.02	.52				
				1700	.00	.52				
				1745	.49	.89				
				1758	2.17	1.35				
				1813	.72	1.53				
				1848	2.74	3.13				
				2018	.49	3.86				
				2118	1.54	5.40				
			6-16	0008	.12	5.74				
				0728	.02	5.89				

SELECTED RUNOFF EVENTS

A58

WATERSHED W-11 (44.04)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
Event of August 28 - September 1, 1957										
8-3	.76	.00	8-28	RG	D-31-R		8-29	0007	.0000	.0000
8-16	1.92	.0129	8-29	2353	.00	.00		0021	.0068	.0004
8-23	.09	.00		0008	.92	.23		0035	.0959	.0016
8-28	.09	.00		0011	3.00	.38		0038	.0934	.0163
Watershed conditions: Corn + in roasting-ear stage, damage from grass-hoppers. Sorghum - 2' high and heading, good condition. Alfalfa - 3rd cutting about Aug 24. Good condition. Pasture - 6" high, fair condition. The fall plowing of the stubble ground had started and the fallow ground was ready for planting of fall wheat. The watershed is predominantly straight-row farmed. The land use in percentage of the watershed area was as follows: Corn 5% Wheat 14% Oats 2% Sorghum 27% Fallow 17% Clover 1% Alfalfa 6% Meadow 2% Pasture 22% Farmsteads 2% Roads 2%				0027	5.02	1.72		0048	.105	.0329
				0037	1.56	1.98		0108	.0854	.0647
				0043	.30	2.01		0128	.118	.0972
				0047	1.95	2.14		0133	.117	.1070
				0103	.34	2.23		0155	.0915	.1451
				0113	1.50	2.48		0210	.0796	.1665
				0303	.20	2.84		0300	.0666	.2282
				1308	.01	2.92		0420	.0544	.3088
			8-28	RG	A-31-R			0450	.0549	.3362
			8-29	2358	.00	.00		0625	.0903	.4525
				0010	.35	.07		0820	.0897	.6254
				0020	1.20	.27		1000	.0927	.7764
				0029	2.93	.71		1200	.0878	.9587
				0044	.80	.91		1300	.0819	1.0436
				0050	2.10	1.12		1330	.0744	1.0826
				0106	.68	1.30		1415	.0379	1.1259
				0120	2.74	1.94		1905	.0147	1.1466
				0300	.11	2.12		1610	.0048	1.1564
				0730	.00	2.12		2100	.0009	1.1656
				1000	.01	2.15	9-1	1000	.0000	1.1718
			8-28	RG	B-32-R					
			8-29	2350	.00	.00				
				0014	.55	.22				
				0028	2.57	.82				
				0043	.76	1.01				
				0050	1.71	1.21				
				0106	.49	1.34				
				0117	2.73	1.84				
				0302	.11	2.04				
				0900	.00	2.04				
				1130	.01	2.07				
			8-28	RG	C-31-R					
				Total		2.50				
				RG	E-30-R					
			8-29	2350	.00	.00				
				2356	.20	.02				
				0012	1.42	.40				
				0018	4.50	.85				
				0030	3.40	1.53				
				0050	.81	1.80				
				0104	.13	1.83				
				0108	1.65	1.94				
				0014	4.70	2.41				
				0017	4.07	2.55				
				0202	.21	2.71				
				0502	.05	2.85				
			8-28	RG	G-42-R					
			8-29	2346	.00	.00				
				2351	.36	.03				
				0006	1.88	.50				
				0025	4.36	1.88				
				0106	.72	2.37				
				0114	3.75	2.87				
				0534	.05	3.10				
Event of July 3-6, 1959										
6-19	.67	.01	7-3	RG	E-30-R		7-3	2041	.0000	.0000
6-20	1.23	.19		2020	.00	.00		2049	.0014	.0001
6-22	.26	.07		2034	.13	.03		2101	.0258	.0031
6-28	1.87	.54		2040	3.50	.38		2129	.145	.0432
6-30	.35	.05		2048	4.80	1.02		2133	.145	.0529
Watershed conditions: Corn - 1' high, thin stand poor condition. Wheat - 3-4' high, ripe, good condition. Sorghum - 6" high, good stand. Oats - 2' high, thin stand. Alfalfa - 1st cutting, picked up; 2nd growth about 4" high. Fallow - ground bare, loose and rough. Meadow - 8" high, good condition. Pasture - good cover, good condition. Most of fallow ground had been plowed before the storm. The watershed is predominantly straight-row farmed. The land use (partly estimated) in percentage of the watershed area was as follows: Corn 9% Wheat 21% Oats 1% Sorghum in rows . . . 19%				2052	3.15	1.23		2201	.115	.1134
				2100	2.02	1.50		2221	.0970	.1486
				2104	2.70	1.68		2245	.0910	.1861
				2108	6.00	2.08		2257	.0925	.2044
				2112	4.20	2.36		2301	.103	.2109
				2116	2.40	2.52		2309	.152	.2277
				2120	1.65	2.63		2325	.221	.2781
			7-4	2130	.12	2.65		2341	.237	.3401
				1000	.00	2.65		0001	.223	.4174
				1530	T	2.68	7-4	0201	.109	.7401
			7-3	RG	A-31-R			0301	.0853	.8360
				2031	.00	.00		0501	.0635	.9826
				2040	6.47	.97		0701	.0530	1.0986
				2044	4.20	1.25		0921	.0369	1.2054
				2049	2.64	1.47		1033	.0119	1.2347
				2052	1.40	1.54		1201	.0028	1.2460
				2102	2.34	1.93	7-5	0001	.0001	1.2525
				2113	1.80	2.26	7-6	2330	T	1.2526
				2117	.75	2.31				
				2137	.06	2.33				
				RG	B-32-R					
				2032	.00	.00				
				2044	5.75	1.15				
				2102	1.89	1.79				
				2106	2.70	1.97				
				2110	3.75	2.22				

Continued on next page

SELECTED RUNOFF EVENTS

ANTECEDENT CONDITION			RAINFALL				RUNOFF				
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	
Event of July 3-6, 1959 - Continued											
Watershed conditions: (Continued)			7-3	RG	B-32-R						
				2114	2.70	2.40					
				2117	.80	2.44					
				2125	.15	2.46					
			7-4	1000	.00	2.46					
				1530	T	2.48					
			7-3	RG	C-31-R						
				2032	.00	.00					
				2036	2.55	.17					
				2041	6.12	.68					
Fallow	15%			2046	3.96	1.01					
Sudan	1%			2050	1.65	1.12					
Alfalfa	5%										
Pasture	22%			2054	3.60	1.36					
Meadow	3%			2106	1.95	1.75					
Farmsteads	2%			2114	5.02	2.42					
Roads	2%			2118	1.20	2.50					
				2122	.45	2.53					
			7-4	1200	T	2.57					
			7-3	RG	D-31-R						
				Total	NR	2.36					
				RG	G-42-R						
				2040	.00	.00					
				2042	2.40	.08					
				2048	4.00	.48					
				2055	2.49	.77					
				2100	.84	.84					
				2107	2.66	1.15					
				2125	4.40	2.47					
				2130	.36	2.49					
				2200	.02	2.51					
Event of May 15-17, 1960											
			5-15	RG	D-31-R			5-15	2156	.0000	.0000
4-17	.20	.00		2050	.00	.00			2210	.0241	.0017
4-25	.11	.00		2102	.50	.10			2220	.0813	.0094
4-27	.06	.00		2137	.07	.14			2236	.1070	.0344
4-28	.09	.00		2149	1.80	.50			2244	.118	.0495
4-29	.34	.00		2205	5.22	1.89					
5-3	.10	.00		2214	1.27	2.08			2304	.102	.0866
5-5	1.50	.06		2224	3.30	2.63			2324	.0889	.1170
5-6	.12	.01		2250	.23	2.73			2352	.0801	.1566
				RG	A-31-R			5-16	0004	.0883	.1722
Watershed conditions: Crops				2056	.00	.00			0016	.186	.1977
in following condition:				2106	.36	.10					
Corn - some planted				2114	.60	.14			0024	.209	.2233
Wheat 12" tall, excellent				2142	.40	.19			0052	.215	.3233
Oats - 4" tall, good				2156	2.14	.69			0104	.224	.3677
Sorghum - some planted									0120	.231	.4277
Alfalfa - 10" tall, good									0154	.192	.5497
Meadow - 4" tall, good				2210	3.81	1.58					
Pasture - 2" tall, fair				2220	.84	1.72			0224	.150	.6366
Ground too wet for good				2232	2.70	2.26			0244	.120	.6833
tillage. Pasture and mea-				2238	.01	2.28			0344	.0980	.7966
dow with fair ground cover.									0424	.0832	.8566
Watershed predominantly in				RG	B-32-R				0512	.0764	.9197
straight-row farming. The				2057	.00	.00					
land use (partially estimated)				2101	1.05	.07			0544	.0630	.9566
in percentage of the watershed				2113	.40	.15			0624	.0298	.9877
area was as follows:				2145	.19	.25			0756	.0068	1.0117
				2155	2.76	.71			0844	.0048	1.0157
Sorghum	29.7%							5-17	1100	.0000	1.0377
Pasture	21.3%			2200	1.56	.84					
Fallow	14.4%			2208	5.03	1.51					
Wheat	15.2%			2215	1.12	1.64					
Corn	7.0%			2229	2.18	2.15					
Alfalfa	5.1%			2243	.30	2.22					
Meadow	2.6%										
Roads	1.9%			RG	C-31-R						
Farmsteads	1.3%			2053	.00	.00					
Sudan	1.2%			2059	1.50	.15					
Barley . . . . .	.3%			2140	.13	.24					
				2155	2.24	.80					
				2207	2.85	1.57					
				2213	.50	1.62					
				2227	2.83	2.28					
				2247	.15	2.33					
				RG	E-30-R						
				2050	.00	.00					
				2100	.54	.09					
				2138	.22	.23					
				2150	1.65	.56					
				2206	4.80	1.84					
				2215	1.00	1.99					
				2226	2.95	2.53					
				2242	.34	2.62					
				RG	G-42-R						
				2050	.00	.00					
				2058	.68	.09					
				2133	.10	.15					
				2150	2.01	.72					
				2204	3.86	1.62					
				2216	1.25	1.87					
				2226	3.00	2.37					
				2244	.33	2.47					

SELECTED RUNOFF EVENTS				A60		WATERSHED W-11 (44.04)				
ANTECEDENT CONDITION			RAINFALL			RUNOFF				
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
Event of June 14-17, 1961										
5-16	.14	.00	6-14	RG	D-31-R		6-15	0007	.0000	.0000
5-17	.70	.01		2356	.00	.00		0035	.0187	.0031
5-19	.54	.02	6-15	2358	1.50	.05		0051	.0312	.0020
5-20	.27	.01		0014	.11	.08		0103	.0559	.0087
5-21	1.86	.34		0021	1.03	.20		0111	.0729	.0174
				0038	.67	.39			.0260	
5-22	1.17	.46		0050	2.30	.85		0123	.0843	.0417
5-30	.07	.00		0058	2.93	1.24		0131	.0869	.0531
5-31	.13	.00		0116	.60	1.42		0203	.0875	.0996
6-2	.09	.00		0122	1.20	1.54		0243	.0921	.1595
6-4	.03	.00		NR	NR	3.09		0323	.0968	.2224
6-5	.88	T								
6-6	.46	.02	6-14	RG	A-31-R			0403	.100	.2880
6-13	.22	.00		2258	.00	.00		0443	.101	.3550
Watershed conditions: Crops in following condition: Corn - just out of ground, fair Wheat - about 3' tall, excellent Oats - 2' tall, good Sorghum - just out of ground, fair Alfalfa - about 2' tall, excellent Meadow - 16" tall, excellent Pasture - 6" tall, excellent Late cultivation of fields due to wet soil. Pasture and meadow with good ground cover. Watershed predominantly in straight-row farming. The land use (partially estimated) in percentage of the watershed area was as follows:			6-15	2347	.03	.04		0523	.0980	.4213
				2357	.84	.18		0543	.0875	.4523
			6-15	0010	.00	.18		0559	.0832	.4750
				0017	.94	.29				
				0028	.22	.33		0643	.0857	.5370
				0032	.45	.36		0703	.0850	.5654
				0048	.08	.38		0823	.0693	.6686
				0104	.71	.57		1003	.0554	.7719
				0114	.18	.60		1143	.0463	.8568
				0129	.44	.71		1159	.0429	.8687
				0135	1.00	.81		1243	.0202	.8913
				0150	.24	.87		1323	.0097	.9008
				0207	.11	.92		1343	.0076	.9037
				0214	.43	.97		1420	.0053	.9077
				0239	.60	1.22		1520	.0032	.9119
				0250	.27	1.27		1620	.0022	.9146
				0318	.17	1.35		1820	.0012	.9180
				0340	.11	1.39		2100	.0007	.9205
				0450	.01	1.40		2240	.0005	.9215
Sorghum	21.8%		6-14	RG	B-32-R		6-16	0400	.0003	.9232
Pasture	21.0%			2308	.00	.00		1000	.0002	.9247
Fallow	20.1%		6-15	2400	.10	.09		1200	.0004	.9254
Wheat	16.4%			0009	.00	.09	6-17	2000	.0001	.9272
Alfalfa	5.8%			0014	.24	.11		T		.9281
Corn	4.8%			0021	.86	.21				
Meadow	3.7%			0032	.33	.27				
Oats	2.2%			0047	.08	.29				
Roads	1.8%			0100	.74	.45				
Farmsteads	1.3%			0103	.60	.48				
Sudan	1.1%			0108	1.80	.63				
				0114	.90	.72				
				0130	.26	.79				
				0145	.80	.99				
				0215	.34	1.16				
				0230	.96	1.40				
				0245	.72	1.58				
				0320	.20	1.70				
				0420	.08	1.78				
			6-14	RG	C-31-R					
				2354	.00	.00				
			6-15	0018	.13	.05				
				0028	.90	.20				
				0040	1.25	.45				
				0051	.65	.57				
				0106	.36	.66				
				0116	.66	.77				
				0121	1.92	.93				
				0125	.75	.98				
				0140	.32	1.06				
				0210	1.08	1.60				
				0216	.60	1.66				
				0256	.23	1.81				
				0306	.48	1.89				
				0421	.20	2.14				
				0551	.01	2.16				
			6-15	RG	E-30-R					
				2400	.00	.00				
				0007	1.46	.17				
				0016	.07	.18				
				0027	1.14	.39				
				0040	1.99	.82				
				0056	3.11	1.65				
				0059	2.40	1.77				
				0106	1.71	1.97				
				0144	.49	2.28				
				0152	1.20	2.44				
				0230	.88	3.00				
				0248	1.23	3.37				
				0324	.50	3.67				
				0402	.19	3.79				
				0438	.05	3.82				
				0538	.01	3.83				
			6-15	RG	G-42-R					
				0003	.00	.00				
				0007	1.50	.10				
				0014	3.43	.50				
				0019	1.08	.59				
				0022	3.40	.76				

Continued on next page

SELECTED RUNOFF EVENTS

A61

WATERSHED W-11 (44.04)

ANTECEDENT CONDITION

RAINFALL

RUNOFF

Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
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Event of June 14-17, 1961 - Continued

6-15	0026	1.05	.83
	0039	2.08	1.28
	0049	2.58	1.71
	0005	1.58	2.13
	0017	.50	2.23
	0047	.38	2.42
	0027	1.26	3.26
	0047	.69	3.49
	0327	.44	3.78
	0357	.28	3.92
	0427	.12	3.98
	0457	.02	3.99

Thiessen weighted average 2.69

Event of August 23-26, 1962

7-26	.09	.00	8-23	1925	.99	.00	8-23	1950	.0000	.0000
7-27	.65	.00		1936	.22	.04		2010	.0109	.0019
7-29	.09	.02		1942	4.00	.44		2030	.0343	.0094
8-2	.44	T		1944	7.50	.69		2040	.0367	.0153
8-4	.31	.01		1948	5.25	1.04		2110	.0276	.0314
8-10	.30	T		1950	9.00	1.34		2210	.0221	.0562
8-11	.04	.00		1954	3.45	1.57		2240	.0221	.0673
8-15	.04	.00		1956	4.80	1.73		2400	.0251	.0989
8-20	.01	.00		2000	2.25	1.88	8-24	0020	.0264	.1073
8-22	.02	.00		2004	.30	1.90		0040	.0512	.1203
8-23	.48	.00		2024	.09	1.93		0100	.0667	.1399
Watershed conditions:			8-24	2340	.00	1.93		0130	.0640	.1726
Corn - 8' high, ears well				0022	.18	2.06		0210	.0572	.2130
filled				0032	.66	2.17		0230	.0572	.2321
Wheat - harvested				0100	.25	2.29		0330	.0587	.2900
Oats - harvested				0240	.07	2.41		0500	.0572	.3770
Sorghum - 5' tall, good				RG				0630	.0548	.4610
condition			8-23	1920	.00	.00		0800	.0494	.5391
Meadow - 18" high, good			8-24	0230		1.77		0900	.0440	.5858
condition				RG				0930	.0407	.6070
The land use in percentage			8-23	1919	.00	.00		1030	.0239	.6393
of the watershed was as				1932	.23	.05		1100	.0172	.6496
follows:				1937	1.56	.18		1200	.0102	.6633
Corn 4%				1948	4.31	.97		1400	.0057	.6792
Sorghum 22%				1953	3.12	1.23		1600	.0031	.6880
Oats 2%				2000	2.40	1.51		1800	.0018	.6929
Wheat 18%				2002	1.80	1.60		2100	.0010	.6971
Fallow 17%				2010	.51	1.66	8-25	1200	.0001	.7028
Alfalfa 8%				2330	.00	1.66	8-26	1200	.0000	.7040
Pasture 22%			8-24	0020	.10	1.74				
Meadow 3%				0030	.90	1.89				
Sudan 1%				0055	.26	2.00				
Farm Yard 1%				0240	.07	2.12				
Roads 2%				RG						
			8-23	1925	.00	.00				
			8-24	0230		2.61				
			8-23	1938	.00	.00				
				1941	2.00	.10				
				1947	5.80	.68				
				1952	7.92	1.34				
				1956	4.65	1.65				
				2000	3.15	1.86				
				2010	.06	1.87				
				2350	.00	1.87				
				2400	.24	1.91				
			8-24	0010	.96	2.07				
				0022	2.70	2.61				
				0032	1.44	2.85				
				0100	.33	3.00				
				0200	.10	3.10				
			8-23	1940	.00	.00				
				1948	4.42	.59				
				1953	3.72	.90				
				1958	2.76	1.13				
				2004	.20	1.15				
				2104	.01	1.16				
				2355	.00	1.16				
			8-24	0014	.38	1.28				
				0032	2.10	1.91				
				0102	.58	2.20				
				0240	.09	2.34				
			6 RG	AVG		2.39				

SELECTED RUNOFF EVENTS

WATERSHED W-11 (44.04)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
Event of September 9, 1963										
8-11	6 RG .10	.00	9-9	RG	E-30-R		9-9	1540	.0003	.0000
8-12	.53	.00		1535	.00	.00		1620	.0078	.0026
8-17	.05	.00		1541	2.10	.21		1700	.0046	.0068
8-19	.80	.00		1550	.60	.30		1820	.0030	.0118
8-23	.19	.00		1554	1.35	.39		1900	.0030	.0138
				1600	.60	.45				
8-27	.04	.00		1630	.10	.50		2140	.0136	.0386
9-1	2.29	.04	9-10	0054	.00	.50		2200	.0318	.0466
9-2	.00	.01		0103	.40	.56		2300	.0381	.0815
9-4	.36	.01		0112	.53	.64		2320	.0375	.0941
9-7	.07	.00		0118	2.60	.90		2400	.0344	.1181
9-9	.69	.01		0125	.95	1.01	9-10	0120	.0282	.1598
Watershed conditions: Sorghum: Approximately 5-6' high and mature, some extra growth prior to selected event due to rainfall in early Sept. Last cultivation July 10-20 with row crop cultivator. Wheat: Approximately one- half of wheat stubble was disked or plowed by August 15th; balance idle. Fallow: Cultivated from August 20 to 30 with surface type equipment; soil very dry. Alfalfa: Small amount of growth from second cutting, July 20, to Sept. 9. Pasture: Grass 1-4" high brown from drought and over- grazed.				0130	.84	1.08		0220	.0392	.1935
				0135	.48	1.12		0300	.0389	.2195
				0152	.28	1.20		0400	.0298	.2539
				0202	2.52	1.62		0440	.0301	.2738
				0206	.90	1.68		0540	.0313	.3045
				0229	.23	1.77		0700	.0421	.3535
				0307	.34	1.98		0740	.0409	.3811
				0416	.02	2.00		0840	.0443	.4237
								0920	.0438	.4531
			9-9	RG	A-12-R			1200	.0290	.5502
				1518	.00	.00		1340	.0189	.5901
	1522	3.15	.21		1500	.0088	.6027			
	1525	2.40	.23		1600	.0052	.6097			
	1527	2.70	.32		1800	.0023	.6172			
	1530	2.00	.42							
	1534	1.20	.50		2000	.0013	.6208			
	1540	2.20	.71		2400	.0006	.6246			
	1543	.80	.75	9-11	0800	.0002	.6278			
	1547	1.65	.86		1600	.0001	.6290			
	1551	5.40	1.22		2300	.0001	.6297			
	1556	3.00	1.47							
	1600	2.40	1.63							
	1607	.34	1.67							
	1616	.27	1.71							
	1640	.05	1.73							
9-10	1720	.06	1.77							
	0040	.00	1.77							
	0101	.14	1.82							
	0104	1.00	1.87							
	0108	1.20	1.95							
	0115	.51	2.01							
	0120	1.20	2.11							
	0133	.32	2.18							
	0203	.26	2.31							
	0210	.77	2.40							
	0212	3.30	2.51							
	0220	.68	2.60							
	0228	.83	2.71							
	0236	.60	2.79							
	0244	.08	2.80							
	0314	.10	2.85							
	0404	.01	2.86							
	1104	.00	2.88							
	1309	.01	2.91							
9-9	RG	B-31-R								
	1515	.00	.00							
	1711		1.77							
9-10	0040	.00	1.77							
	0340		2.80							
9-9	RG	C-31-R								
	1508	.00	.00							
	1512	.90	.06							
	1525	.23	.11							
	1532	2.31	.38							
	1537	.48	.42							
	1542	1.44	.54							
	1544	6.30	.75							
	1546	2.40	.83							
	1554	.45	.89							
	1605	.71	1.02							
9-10	1705	.04	1.06							
	0037	.00	1.06							
	0053	.15	1.10							
	0102	.27	1.14							
	0110	.15	1.16							
	0116	.70	1.23							
	0130	.43	1.33							
	0200	.26	1.46							
	0213	1.90	1.87							
	0221	.98	2.00							
	0235	.21	2.05							
	0240	.72	2.11							
	0330	.08	2.18							
	1100	.00	2.20							
9-9	RG	D-31-R								
	1520	.00	.00							
	1725		.99							
9-10	0054	.00	.99							
	0203		2.24							
9-9	RG	G-42-R								
	1531	.00	.00							
	1535	.60	.04							
	1542	.17	.06							
	1556	.77	.24							
	1618	.16	.30							

Continued on next page

Continued on next page

SELECTED RUNOFF EVENTS

WATERSHED W-11 (44.04)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
Event of September 9, 1963 - Continued										
			9-9	1804	.02	.33				
			9-10	0057	.00	.33				
				0114	.56	.49				
				0124	.30	.54				
				0134	.36	.60				
				0140	.20	.62				
				0144	.75	.67				
				0147	.40	.69				
				0154	.95	.80				
				0202	.60	.88				
				0217	.20	.93				
				0225	.60	1.01				
				0229	2.10	1.15				
				0252	.10	1.19				
				0322	.06	1.22				
			6 RG	AVG		2.22				
Event of June 11-12, 1964										
5-12	.07	.00	6-11	RG	E-30-R	.00	6-11	1830	.0000	.0000
5-15	.05	.00		1810		.36		1920	.0128	.0016
5-26	.24	.00		1834	.90	.89		1935	.0098	.0045
5-27	.26	.00		1844	3.18	1.22		1950	.0304	.0095
6-3	.03	.00		1903	1.04	1.30		2020	.0324	.0252
				1922	.25					
6-4	1.04	.00		1930	2.93	1.69		2030	.0290	.0303
6-11	.03	.00		1939	2.07	2.00		2050	.0178	.0381
				2004	.26	2.11		2110	.0130	.0432
								2120	.0130	.0454
								2230	.0206	.0650
Watershed conditions:										
Estimated 25% of W-11 had										
conservation practices, such										
as terraces, contouring										
grassed waterways, etc.										
Corn: 6" to 8" high. Fair										
condition, 6% cover.										
Milo: 2" to 5" high. Fair										
to good condition. 5% cover.										
Wheat: All headed out. 24"										
to 40" tall. Some spots of										
rather short growth. 85 to										
90% cover.										
Fallow: All fields plowed										
by June 6th some with sweeps										
of disk or spring tooth.										
0% cover.										
Alfalfa: 2nd growth coming										
on 6" to 10" high, excellent										
condition. 75% cover.										
Pastures: Short early grass										
heading out. Some summer										
grasses greening up. Most										
overgrazed. 60% cover.										
Meadow: Fair, summer grasses										
slow starting growth 6" to 12".										
65% cover.										
Sudan: Good, 0" to 4" high.										
Some just planted. 0% to 6%										
cover.										
The land use in percentage										
of the watershed area was as										
follows:										
Corn	. . . . .	1%								
Milo	. . . . .	29%								
Oats	. . . . .	1%								
Wheat	. . . . .	16%								
Fallow	. . . . .	15%								
Alfalfa	. . . . .	9%								
Pasture	. . . . .	21%								
Meadow	. . . . .	3%								
Sudan	. . . . .	2%								
Farm Yard	. . . . .	1%								
Roads	. . . . .	2%								
				RG	B-31-R	.00				
				1810		.00				
						2.20				
				RG	C-31-R	.00				
				1808		.00				
				1819	2.73	.50				
				1830	.60	.61				
				1845	2.92	1.34				
				1851	1.30	1.47				
				1907	.68	1.65				
				1919	.25	1.70				
				1928	1.46	1.92				
				1935	2.91	2.26				
				1957	.38	2.40				
				RG	D-31-R	.00				
				1808		.00				
				2000		2.02				
				RG	G-42-R	.00				
				1813	.00	.04				
				1829	.15	.07				
				1831	.90	.09				
				1836	.24	.31				
				1841	2.64	.32				
				1845	.15	.55				
				1848	4.60	.70				
				1853	1.80	.73				
				1858	.36	.96				
				1903	2.76					
				1908	.48	1.00				
				1927	.06	1.02				
				1930	5.00	1.27				
				1934	1.95	1.40				
				1937	1.20	1.46				
				1940	3.20	1.62				
				1950	.66	1.73				
				2000	.30	1.78				
				2012	.20	1.82				
			6 RG	AVG		2.15				

Watershed conditions:

Estimated 25% of W-11 had conservation practices, such as terraces, contouring grassed waterways, etc.

Corn: 6" to 8" high. Fair condition, 6% cover.

Milo: 2" to 5" high. Fair to good condition. 5% cover.

Wheat: All headed out. 24" to 40" tall. Some spots of rather short growth. 85 to 90% cover.

Fallow: All fields plowed by June 6th some with sweeps of disk or spring tooth. 0% cover.

Alfalfa: 2nd growth coming on 6" to 10" high, excellent condition. 75% cover.

Pastures: Short early grass heading out. Some summer grasses greening up. Most overgrazed. 60% cover.

Meadow: Fair, summer grasses slow starting growth 6" to 12". 65% cover.

Sudan: Good, 0" to 4" high. Some just planted. 0% to 6% cover.

The land use in percentage of the watershed area was as follows:

Corn 1%
Milo 29%
Oats 1%
Wheat 16%
Fallow 15%
Alfalfa 9%
Pasture 21%
Meadow 3%
Sudan 2%
Farm Yard 1%
Roads 2%

SELECTED RUNOFF EVENTS

WATERSHED W-11 (44.04)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
Event of June 1-2, 1965										
6 RG				RG	E-30-R					
5-4	.44	.0000	6-1	2252	.00	.00	6-1	2300	.0000	.0000
5-5	.14	.0000		2302	.60	.10		2320	.0053	.0004
5-7	.63	.0000		2328	2.54	1.20		2330	.0358	.0039
5-8	.02	.0026		2336	1.05	1.34		2340	.0751	.0131
5-9	.00	.0010		2400	.70	1.62		2350	.0782	.0259
5-13	.16	.0000	6-2	0005	.24	1.64	6-2	2400	.0766	.0388
5-14	.51	.0000						0010	.0766	.0511
5-17	.27	.0004		RG	B-31-R			0030	.0578	.0731
5-18	.00	.0016	6-1	2300	.00	.00		0110	.0457	.1072
5-21	2.68	.0606		2400	1.11	1.11		0130	.0467	.1224
			6-2	0006	.50	1.16				
5-22	3.23	2.7231						0200	.0651	.1488
5-23	.00	.0128		RG	D-31-R			0220	.0829	.1737
5-24	1.13	.4815	6-1	2303	.00	.00		0240	.0977	.2046
5-25	.14	.0215		2400	1.40	1.33		0310	.0927	.2517
5-26	.00	.0194	6-2	0016	.45	1.45		0350	.0693	.3046
5-27	.00	.0015		RG	C-31-R			0430	.0621	.3482
5-31	.04	.0000	6-1	2302	.00	.00		0450	.0617	.3688
				2312	.90	.15		0530	.0630	.4103
Watershed conditions:				2338	2.49	1.23		0610	.0596	.4514
Corn: Just planted				2400	.63	1.46		0700	.0537	.4987
Sorghum: 50% planted			6-2	0008	.38	1.51				
Wheat: 18" to 30" high				RG	G-42-R			0800	.0450	.5480
70% headed, in good con-				2256	.00	.00		0840	.0369	.5757
dition. Ground cover 85%.			6-1	2306	2.04	.34		0930	.0186	.5989
Alfalfa: 24" to 36" high,				2336	2.32	1.50		1030	.0067	.6104
in good condition. Ground				2400	.73	1.79		1200	.0037	.6180
cover 90%.			6-2	0006	.20	1.81		1300	.0022	.6209
Pasture: 3" to 6" high,				RG	A-12-R	1.16		1430	.0015	.6237
in good condition.								1600	.0010	.6256
Meadow: 6" to 20" high,								1800	.0007	.6272
in good condition. Ground								2100	.0004	.6289
cover 90%.										
The land use in percentage								2400	.0003	.6300
of the watershed area was							6-3	0800	.0001	.6316
as follows:								1600	.0001	.6324
Corn	1%						6-4	1600	.0000	.6336
Sorghum	23%									
Wheat	13%									
Fallow	24%									
Alfalfa	8%									
Sweet Clover	1%									
Pasture	23%									
Meadow	2%									
Sudan	2%									
Farm Yard	1%									
Roads	2%									

Event of June 12-13, 1965

6 RG				RG	C-31-R						
5-13	.16	.0000	6-12	2108	.00	.00	6-12	2110	.0000	.0000	
5-14	.51	.0000		2116	2.25	.30		2130	.0026	.0003	
5-17	.27	.0004		2126	3.96	.96		2150	.0186	.0028	
5-18		.0016		2146	.54	1.14		2220	.0172	.0118	
5-21	2.68	.0606		2211	.07	1.17		2240	.0143	.0171	
5-22	3.23	2.7231		2330	.00	1.17		2300	.0162	.0221	
5-23	.00	.0128		2400	1.16	1.75		2330	.0211	.0316	
5-24	1.13	.4815	6-13	0155	.08	1.90		2350	.0426	.0421	
5-25	.14	.0215					6-13	0010	.0482	.0654	
5-26	.00	.0194						0040	.0421	.0943	
5-27	.00	.0015	6-12	2116	.00	.00					
5-31	.04	.0000		2131	3.08	.77		0130	.0440	.1312	
6-1	1.40	.0388		2141	.42	.84		0210	.0693	.1777	
6-2	.06	.5912		2211	.24	.96		0230	.0921	.1952	
6-3	.00	.0027		2336	.00	.96		0300	.1240	.2765	
								0320	.1200	.3328	
6-4	.00	.0009	6-13	2400	1.05	1.38					
6-5	.32	.0256		0200	.11	1.60		0410	.0983	.3993	
6-6	.07	.0014						0500	.0977	.4959	
6-7	.04	.0000	6-12	RG	E-30-R			0600	.0861	.5807	
6-9	.93	.0349		2104	.00	.00		0730	.0600	.7038	
				2240	.55	.88		0830	.0525	.7517	
				2326	.00	.88					
6-10	.41	.2272		2400	.62	1.23		0930	.0433	.7720	
6-11	.08	.0170	6-13	0200	.11	1.45		1030	.0284	.7886	
								1110	.0154	.8046	
Watershed conditions:					RG	G-42-R			1230	.0061	.8175
Corn: Just Planted.				6-12	2106	.00	.00		1500	.0023	.8275
Sorghum: 50% planted.					2206	.61	.61				
Wheat: 18" to 30" high.					2324	.00	.61		1700	.0015	.8313
70% headed, in good condition.					2400	.70	1.03		2000	.0008	.8348
Alfalfa: 24" to 36" high, in good condition. Ground cover 90%.				6-13	0200	.12	1.28		2400	.0004	.8372
					RG	A-12-R	2.21	6-14	0800	.0002	.8414
									2000	.0001	.8420
Pasture: 3" to 6" high in good condition.					RG	B-31-R	1.81	6-15	1200	.0000	.8422
Meadow: 6" to 20" high, in good condition. Ground cover 90%.											
The land use in percentage of the watershed area was as follows:											
Corn 1%											
Sorghum 23%											
Wheat 13%											
Fallow 24%											
Alfalfa 8%											
Sweet Clover 1%											
Pasture 23%											
Meadow 2%											
Sudan 2%											
Farm Yard 1%											
Roads 2%											

SELECTED RUNOFF EVENTS

WATERSHED W-11 (44.04)

ANTECEDENT CONDITION

RAINFALL

RUNOFF

Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
<u>Event of July 8, 1967</u>										
6-9	RG		7-8	0140	.00	.00	7-8	0140	.0000	.0000
6-10	.46	.0133		0154	2.31	.54		0315	.0001	.0001
6-11	1.15	.0712		0204	.78	.67		0330	.0092	.0012
6-12	.79	.3562		0250	.04	.70		0340	.0072	.0026
6-13	.01	.1689		0315	1.80	1.45		0400	.0120	.0058
6-15	.00	.0031						0415	.0132	.0090
6-20	.14	.0000		0400	.08	1.51		0455	.0090	.0164
6-21	.41	.0000		0500	.13	1.64		0600	.0135	.0285
6-22	1.02	.1279		0600	.06	1.70		0800	.0198	.0618
6-23	.02	.0052						0930	.0225	.0936
6-24	.16	.0027	6-1	RG	B-31-R					
6-25	.49	.0670		2300	.00	.00		1130	.0245	.1406
6-28	.00	.0049	6-2	2400	1.11	1.33		1300	.0250	.1777
7-4	.09	.0000		0006	.50	1.16		1340	.0235	.1939
7-5	.08	.0000		RG	D-31-R			1440	.0195	.2154
			6-1	2302	.00	.00		1540	.0117	.2310
				2400	1.40	1.33				
			6-2	0016	.45	1.45		1640	.0061	.2399
				RG	C-31-R			1800	.0031	.2460
			6-1	2302	.00	.00		2000	.0015	.2506
				2312	.90	.15	7-9	2400	.0006	.2548
				2338	2.49	1.23		1200	.0001	.2590
			6-2	2400	.63	1.46		2400	.0001	.2602
				0008	.38	1.51	7-10	1100	.0000	.2607
				RG	G-42-R					
			6-1	2256	.00	.00				
				2306	2.04	.34				
				2336	2.32	1.50				
				2400	.73	1.79				
			6-2	0006	.20	1.81				
				RG	A-12-R	1.16				

Watershed conditions: The
land in percentage of the
watershed area was as
follows:

Corn T
Sorghum 27
Wheat 21
Fallow 13
Alfalfa 8
Pasture 22
Meadow 5
Sudan 1
Farm Yard 1
Roads 2

SELECTED RUNOFF EVENTS

WATERSHED 1-H (44.05)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
Event of July 10, 1951										
RG B-36-R			RG B-36-R							
6-13	.79	T	7-10	0530	.00	.00	7-10	0606	.0000	.0000
6-14	.13	T		0542	.15	.03		0607	.03	T
6-21	.48	.00		0548	1.10	.14		0608	.08	T
6-22	.83	.00		0554	2.20	.36		0610	.15	.01
6-25	.74	.00		0600	3.70	.73		0611	.24	.01
6-26	1.09	.12		0606	5.50	1.28		0613	.56	.02
6-27	.10	.00		0610	2.85	1.47		0615	.83	.05
7-10	.16	.00		0626	1.61	1.90		0617	1.09	.08
Watershed conditions: 100% native grass meadow, 12" to 16" high and in good condition.				0634	2.10	2.18		0620	1.16	.13
				0642	.90	2.30		0622	1.07	.17
				0648	.40	2.34		0625	.93	.22
				0658	.36	2.40		0630	.71	.29
				0858	.02	2.44		0635	.62	.34
								0637	.65	.37
								0640	.72	.40
								0643	.78	.44
								0645	.75	.46
								0650	.62	.52
								0653	.48	.55
								0656	.34	.57
								0700	.27	.59
								0710	.10	.62
								0720	.03	.63
								0730	.01	.63
								0747	.00	.64
Event of June 16-17, 1957										
RG B-36-R			RG B-36-R							
5-29	.84	.00	6-16	2310	.06	.00	6-16	2320	.0012	.0000
5-31	.32	.00		2320	.24	.04		2324	.0367	T
6-6	.08	.00		2324	2.55	.21		2328	.353	.01
6-10	.77	.05		2328	4.05	.48		2330	.800	.03
6-13	.87	.13		2332	2.55	.65		2332	1.35	.07
6-15	5.82	.60	6-17	0002	.04	.67		2333	1.35	.09
6-16	.83	.01		0022	.24	.75		2335	1.25	.13
Watershed conditions: Native grass meadow, 14" high and heading; in excellent condition.				0026	.90	.81		2340	.784	.22
				0200	.13	1.01		2343	.537	.25
								2350	.198	.30
								2355	.105	.31
								2400	.0567	.31
							6-17	0005	.0310	.32
								0020	.0167	.32
								0030	.0283	.33
								0300	.0000	.34
Event of June 12, 1958										
RG B-36-R			RG B-36-R							
5-14	.52	.00	6-12	0149	.00	.00	6-12	0205	.0000	.0000
5-15	.22	.00		0200	1.09	.20		0207	.0603	T
5-16	.25	.00		0205	2.88	.44		0209	.228	.01
5-26	.30	.00		0207	5.40	.62		0211	.441	.02
5-27	.15	.00		0209	6.60	.84		0214	.677	.05
6-6	.12	.00		0212	4.00	1.04		0218	.592	.09
Watershed conditions: Native grass meadow, 10" high and in good condition.				0220	2.70	1.40		0220	.512	.11
				0225	.72	1.46		0223	.228	.13
				0235	.36	1.52		0226	.0951	.13
				0308	.20	1.63		0229	.0337	.14
				0311	1.40	1.70		0234	.0095	.14
								0251	.0000	.14
Event of July 3, 1959										
RG B-36-R			RG B-36-R							
6-18	.05	.00	7-3	2031	.00	.00	7-3	2038	.0000	.0000
6-19	.37	.00		2033	3.00	.10		2040	.138	T
6-20	1.31	T		2037	5.70	.48		2043	.375	.01
6-21	.03	.00		2039	8.10	.75		2046	.463	.03
6-28	1.93	.00		2041	7.50	1.00		2048	.488	.05
6-29	.19	.00		2043	5.10	1.17		2051	.452	.07
6-30	.22	.00		2049	2.50	1.42		2054	.501	.10
Watershed conditions: Native grass meadow, 18" high, early grass ripe, in excellent condition.				2052	2.00	1.52		2059	.463	.14
				2055	3.20	1.68		2100	.463	.15
				2101	2.00	1.88		2106	.677	.20
				2109	3.30	2.32		2108	.751	.23
				2111	2.40	2.40		2110	.767	.25
				2114	3.60	2.58		2113	.901	.30
				2116	1.50	2.63		2117	.737	.35
								2121	.397	.39
								2123	.261	.40
								2129	.0603	.41
								2132	.0310	.42
								2210	.0000	.42

SELECTED RUNOFF EVENTS

WATERSHED 1-H (44.05)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
<u>Event of May 15, 1960</u>										
RG B-36-R										
4-16	.20	.00	5-15	2054	.00	.00	5-15	2209	.0000	.0000
4-25	.11	.00		2104	.96	.16		2214	.364	.02
4-27	.07	.00		2114	.24	.20		2218	.521	.04
4-28	.08	.00		2140	.09	.24		2225	.538	.106
4-29	.29	.00		2144	.60	.28		2228	.564	.12
5-3	.18	.00		2152	1.73	.51		2231	.833	.17
5-5	1.61	.00		2156	3.90	.77		2234	.970	.22
5-6	.14	.00		2202	1.90	.96		2237	.837	.258
				2210	4.73	1.59		2241	.578	.31
				2216	.60	1.65		2246	.315	.34
Watershed conditions:				2222	1.60	1.81		2251	.133	.36
100% native grass				2228	3.00	2.11		2306	.129	.375
meadow; meadow about 4"				2232	2.55	2.28		2340	.0000	.38
high, fair condition,				2252	.15	2.33				
good cover.										

Event of August 11, 1961

				RG	B-36-R					
7-13	.27	.00	8-11	0026	.00	.00	8-11	0045	.0000	.0000
7-18	.17	.00		0038	3.70	.74		0046	.170	.0015
7-20	.32	.00		0042	.30	.76		0048	.279	.01
7-21	.05	.00		0052	4.44	1.50		0051	.236	.02
7-22	.18	.00		0100	.82	1.61		0054	.324	.036
7-26	.13	.00		0130	.18	1.70		0055	.353	.04
8-1	.21	.00		0150	.03	1.71		0057	.441	.06
8-4	.06	.00						0059	.388	.0685
								0103	.170	.09
								0104	.135	.0899
Watershed conditions:								0106	.064	.09
100% native grass								0150	.00	.0969
meadow; meadow about										
14" high and forming										
seed, good condition,										
good cover.										

Event of July 26, 1964

	RG B-36-R			RG	B-36-R					
7-1	.45	.00	7-26	1644	.00	.00	7-26	1653	.0000	.0000
7-7	.29	.00		1651	6.69	.78		1656	.081	T
7-8	.11	.00		1655	4.35	1.07		1658	.441	.01
7-10	.50	T		1658	4.20	1.28		1701	1.490	.06
7-11	.17	.00						1704	.934	.12
7-26	.09	.00						1707	.408	.15
								1710	.261	.17
Watershed conditions:								1713	.116	.18
Watershed in drilled								1718	.023	.18
sudan (7" drill spac-								1738	.0000	.19
ing) mowed on July 20.										
Baled on July 26.										
Stubble about 2" high.										
Surface dry and no										
new growth started.										
Ground cover 10%.										

Event of May 21-22, 1965

RG B-36-R			RG B-36-R							
4-24	.71	.00	5-21	2141	.00	.00	5-21	2146	.0000	.0000
5-4	.57	.00		2146	1.32	.11		2152	2.35	.10
5-7	.77	.01		2207	4.23	1.59		2200	1.68	.36
5-8	.02	.00		2215	1.35	1.77		2203	2.20	.44
5-14	.71	T		2229	.60	1.91		2210	1.14	.65
5-17	.20	.00		2239	2.58	2.34		2226	.21	.82
				2244	3.96	2.67		2235	1.29	.91
Watershed conditions:				2254	2.52	3.09		2240	2.03	1.05
No tillage during spring.				2304	.96	3.25		2243	2.09	1.15
Cover is weeds and sudan				2314	.24	3.29		2248	1.66	1.31
stubble.				2319	.84	3.36		2252	1.84	1.42
								2306	.44	1.68
								2317	.21	1.73
								2345	.03	1.78
							5-22	0015	.0000	1.79

SELECTED RUNOFF EVENTS

WATERSHED 1-H (44.05)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc., (in.)
<u>Event of May 22, 1965</u>										
	RG B-36-R			RG	B-36-R					
4-24	.71	.00	5-22	0137	.00	.00	5-22	0139	.0000	.0000
5-4	.57	.00		0145	3.15	.42		0144	.92	.03
5-7	.77	.01		0150	.96	.50		0151	.44	.11
5-8	.02	.00		0228	.03	.52		0205	.11	.17
5-14	.71	T		0238	.60	.62		0220	.04	.19
5-17	.20	.00		0310	.04	.64		0320	.00	.21
5-21	3.36	1.79		0343	.27	.79		0425	.00	.21
				0425	.00	.79		0435	.06	.22
Watershed conditions:				0433	1.73	1.02		0441	.14	.23
No tillage during spring.				0457	.10	1.06		0445	.14	.24
Cover is weeds and sudan										
stubble.				0517	.39	1.19		0455	.09	.25
				0521	3.00	1.39		0505	.08	.27
				0531	.66	1.50		0513	.08	.07
				0550	1.77	2.06		0522	.44	.32
				0555	3.96	2.39		0527	.46	.36
				0603	1.43	2.58		0535	1.33	.47
				0620	.74	2.79		0540	1.07	.57
				0630	.06	2.80		0545	.92	.66
				0642	1.55	3.11		0551	2.32	.82
				0650	2.45	3.44		0558	1.44	1.04
				0700	.42	3.51		0608	.74	1.23
								0627	.18	1.35
								0635	.44	1.38
								0638	1.03	1.42
								0646	1.79	1.59
								0653	.90	1.74
								0658	.44	1.79
								0725	.06	1.88
								0755	.01	1.90
								0855	.00	1.91

Event of July 8, 1967

RG B-36-R			RG B-36-R							
6-9	.43	.00	7-8	0148	.00	.00	7-8	0255	.0000	.0000
6-10	1.11	.27		0155	1.71	.20		0301	.18	.01
6-11	.90	.35		0201	2.50	.45		0307	1.76	.11
6-15	.18	.00		0210	1.13	.62		0312	1.01	.23
6-20	.35	.00		0215	.48	.66		0317	.54	.30
6-21	1.11	.16		0220	1.56	.79		0322	.18	.33
6-23	.15	.00		0230	.12	.81		0332	.01	.34
6-24	.55	.00		0250	.00	.81		0340	.00	.34
6-28	.16	.00		0305	2.68	1.48				
7-4	.04	.00		0320	1.20	1.78				
7-5	.06	.00		0400	.03	1.80				
Watershed conditions: In wheat, nearly ripe. 24" to 48" high, in good condition with ground cover 75%.				0430	.20	1.90				
				0500	.06	1.93				
				0530	.24	2.05				
				0640	.02	2.07				

WATERSHED 2-H (44.06)

Watershed conditions:
Native grass meadow
10" high and in good
condition.

Watershed conditions:
Native grass meadow
18" high, early grass
ripe, in excellent
condition.

Watershed conditions: 100% native grass meadow; meadow about 4" high, fair condition good cover.

Watershed conditions: 100% native grass meadow; meadow about 14" high and forming seed, good condition, good cover.

SELECTED RUNOFF EVENTS

WATERSHED 2-H (44.06)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
<u>Event of August 23, 1962</u>										
RG B-36-R			RG B-36-R							
7-26	.07	.00	8-23	1920	.00	.00	8-23	1928	.0000	.0000
7-27	.65	.00		1926	.70	.07		1938	T	T
7-29	.06	.00		1934	.00	.07		1948	.01	T
8-2	.17	.00		1937	1.80	.16		1951	.10	T
8-4	.51	.00		1942	3.60	.46		1954	.29	.01
8-10	.13	.00		1945	6.00	.76		1958	.64	.04
8-11	.03	.00		1953	4.65	1.38		2001	.73	.08
8-15	.05	.00		1958	2.28	1.57		2004	.90	.12
8-22	.06	.00		2002	3.00	1.77		2006	1.23	.16
8-23	.58	.00		2010	.60	1.85		2008	1.23	.20
Watershed conditions:				2015	.12	1.86		2013	.83	.28
Native grass meadow; 18"								2018	.53	.34
high and excellent cover.								2023	.32	.37
								2033	.12	.41
								2038	.06	.42
								2053	.01	.43
								2108	T	.43
								2138	.00	.43

Event of June 21, 1964

RG B-36-R			RG B-34-R							
5-26	.25	.00	6-21	0503	.00	.00	6-21	0506	.0000	.0000
5-27	.40	.00		0506	6.20	.31		0509	.315	.01
6-4	1.05	.00		0510	4.35	.60		0512	.203	.02
6-11	2.23	T		0514	4.50	.90		0515	.344	.04
6-12	.32	.00		0519	1.20	1.00		0518	.455	.06
6-13	.42	.00		0536	.25	1.07		0521	.315	.07
6-14	.99	.00						0525	.154	.09
			RG B-36-R		1.02			0535	.033	.10
								0555	.000	.11

Watershed conditions: 100% native grass pasture. Grass 4" to 10" high with moderate grazing (sheep) in selected areas. Grass in fair to good condition. Good cover 75%.

Event of May 21, 1965

RG B-36-R			RG B-36-R							
4-24	.71	.00	5-21	2141	.00	.00	5-21	2147	.0000	.0000
5-4	.57	.00		2146	1.32	.11		2155	1.55	.10
5-7	.77	.00		2207	4.23	1.59		2205	2.97	.38
5-8	.02	.00		2215	1.35	1.77		2215	1.11	.80
5-15	.71	.00		2229	.60	1.91		2225	.42	.92
5-17	.20	.00		2239	2.58	2.34		2235	1.41	1.08
Watershed conditions: 100% native grass pasture. Grass 3" to 6" high with moderate grazing (sheep). Grass in fair to good condition. Ground cover 75%.				2244	3.96	2.67		2248	3.04	1.65
				2254	2.52	3.09		2255	2.27	1.96
				2304	.96	3.25		2305	.81	2.21
				2314	.24	3.29		2315	.42	2.32
				2319	.84	3.36		2325	.11	2.36
			RG B-34-R		3.56			2340	.03	2.38
								2400	.00	2.38

Event of June 12-13, 1965

RG B-36-R			RG B-36-R							
5-14	.71	.00	6-12	2116	.00	.00	6-12	2119	.0000	.0000
5-17	.20	.00		2129	2.77	.60		2125	.47	.02
5-21	3.36	2.38		2139	.24	.64		2132	.85	.10
5-22	4.08	2.92		2149	.84	.78		2140	.44	.19
5-24	1.14	.19		2159	.12	.80		2200	.09	.27
5-25	.15	.00		2334	.00	.80		2240	.00	.30
5-31	.07	.00		2347	.83	.98		2348	.00	.30
6-1	1.02	.15		2357	4.20	1.68		2357	3.47	.55
6-2	.10	.00	6-13	0004	1.54	1.86	6-13	0005	1.81	.92
6-5	.32	.00		0147	.04	1.93		0015	.60	1.12
6-6	.12	.00						0025	.21	1.19
6-9	.78	.00						0055	.02	1.24
6-10	.41	.00						0140	.00	1.25
6-11	.09	.00								

Watershed conditions: 100% native grass pasture. Grass 3" to 6" high with moderate grazing (sheep). Grass in fair to good condition. Ground cover 75%.

SELECTED RUNOFF EVENTS

WATERSHED 2-H (44.06)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
<u>Event of July 8, 1967</u>										
RG B-36-R			RG		B-36-R					
6-9	.43	.00	7-8	0148	.00	.00	7-8	0201	.0000	.0000
6-10	1.11	.03		0155	1.71	.20		0207	.02	.00
6-11	.90	.18		0201	2.50	.45		0221	.00	.00
6-15	.18	.00		0210	1.13	.62		0243	.00	.01
6-20	.35	.00		0215	.48	.66		0253	.00	.01
6-21	1.11	T		0220	1.56	.79		0259	.28	.02
6-23	.15	.00		0230	.12	.81		0304	1.17	.08
6-24	.55	.00		0250	.00	.81		0310	.90	.18
6-28	.16	.00		0305	2.68	1.48		0315	.63	.25
7-4	.04	.00		0320	1.20	1.78		0325	.17	.31
7-5	.06	.00		0400	.03	1.80		0336	.03	.33
					0430	.20	1.90	0413	.00	.33
					0500	.06	1.93			
					0530	.24	2.05			
					0640	.02	2.07			
Watershed conditions: 100% native grass pasture. Grass 4" to 10" high with moderate grazing. Grass in good condition. Ground cover 90%.										
				RG	B-34-R		2.10			

SELECTED RUNOFF EVENTS

WATERSHED 3-H (44.07) sq mi

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
Event of July 18-19, 1958										
				RG	B-36-R					
6-20	.20	.00	7-18	2328	.00	.000	7-18	2328	.0000	.0000
6-25	.20	.00		2330	.30	.01		2333	.0588	.01
7-3	.95	.00		2334	4.35	.30		2334	1.12	.02
7-4	.38	.00		2336	3.90	.43		2337	1.10	.02
7-10	.42	.00		2341	1.32	.54		2341	1.20	.11
				2343	3.90	.67		2345	1.56	.20
7-12	.08	.00		2348	.36	.70		2349	1.10	.29
7-15	.31	.00		0048	.02	.72		2354	.6300	.36
7-16	.08	.00	7-19	0110	.02	.74		2357	.4020	.38
7-17	1.03	.20		0110	.02	.76	7-19	0001	.223	.41
Watershed conditions: Wheat harvested on July 8 and 9. Stubble 1' high.										
								0005	.1270	.42
								0013	.0588	.43
								0037	.0135	.44
								0206	.0018	.45

Event of July 3, 1959

				RG	B-36-R					
6-18	.05	.00	7-3	2031	.00	.00	7-3	2034	.0000	.0000
6-19	.37	T		2033	3.00	.10		2036	.421	.01
6-20	1.31	.62		2037	5.70	.48		2038	2.87	.06
6-21	.03	.00		2039	8.10	.75		2041	6.45	.31
6-28	1.93	1.04		2041	7.50	1.00		2042	6.39	.41
6-29	.19	.02		2043	5.10	1.17		2045	4.39	.69
6-30	.22	.03		2049	2.50	1.42		2049	2.45	.92
				2052	2.00	1.52		2052	1.85	1.03
Watershed conditions:				2055	3.20	1.68		2055	2.74	1.14
Sorghum - about 6" high				2101	2.00	1.88		2059	2.27	1.30
and in good condition.										
Weeds beginning to grow.				2109	3.30	2.32		2101	2.27	1.38
Last field operations on				2111	2.40	2.40		2102	2.31	1.42
June 16.				2114	3.60	2.58		2104	3.19	1.51
				2116	1.50	2.63		2106	2.61	1.61
								2107	2.67	1.65
								2109	3.52	1.75
								2110	3.52	1.81
								2112	2.87	1.92
								2114	3.45	2.02
								2115	3.45	2.08
								2120	1.09	2.27
								2122	.592	2.29
								2126	.259	2.32
								2130	.151	2.33
								2137	.0616	2.34
								2200	.0062	2.35
								2245	.0000	2.35

Event of May 15-16, 1960

			RG	B-36-R						
4-16	.20	.00	5-15	2054	.00	.00	5-15	2150	.0000	.0000
4-25	.11	.00		2104	.96	.16		2155	.106	T
4-27	.07	.00		2114	.24	.20		2158	.829	.02
4-28	.08	.00		2140	.09	.24		2200	1.38	.06
4-29	.29	.00		2144	.60	.28		2204	1.06	.14
5-3	.18	.00		2152	1.73	.51		2208	2.45	.24
5-5	1.61	.47		2156	3.90	.77		2210	4.32	.35
5-6	.14	.01		2202	1.90	.96		2215	2.04	.70
Watershed conditions: 100% fallow. No field operation since harvest of sorghum on 10/14/59; good cover.				2210	4.73	1.59		2220	.982	.81
				2216	.60	1.65		2225	1.49	.91
				2222	1.60	1.81		2231	2.98	1.123
				2228	3.00	2.11		2233	2.52	1.218
				2232	2.55	2.28		2235	1.89	1.30
				2252	.15	2.33		2239	.829	1.38
								2244	.421	1.42
								2255	.106	1.47
								2300	.0695	1.477
								2310	.0474	1.49
							5-16	0030	.009	1.51
								0500	.0049	1.53
								1800	.0000	1.56

Event of August 11, 1961

				RG	B-36-R					
7-13	.27	.00	8-11	0026	.00	.00	8-11	0027	.0000	.0000
7-18	.17	.00		0038	3.70	.74		0038	.009	.01
7-20	.32	.00		0042	.30	.76		0044	.421	.02
7-21	.05	.00		0052	4.44	1.50		0048	1.49	.08
7-22	.18	.00		0100	.82	1.61		0050	1.66	.13
7-26	.13	.00		0130	.18	1.70		0053	1.15	.20
8-1	.21	.00		0150	.03	1.71		0055	.829	.236
8-4	.06	.00						0059	.468	.28
								0103	.307	.302
								0110	.116	.33
								0117	.0554	.336
								0135	.009	.34
								0305	.0000	.35
Watershed conditions: 100% Wheat combined on 7/10/61. On 7/18/61 dry residue on land measured 8000# per acre, excellent cover. No field operation since harvest.										

SELECTED RUNOFF EVENTS

WATERSHED 3-H (44.07)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
<u>Event of August 23, 1962</u>										
RG B-36-R			RG B-36-R							
7-26	.07	.00	8-23	1920	.00	.00	8-23	1942	.0000	.0000
7-27	.65	.08		1926	.70	.07		1944	.06	T
7-29	.06	.00		1934	.00	.07		1947	.42	.01
8-2	.17	.00		1937	1.80	.16		1949	1.00	.04
8-4	.51	.02		1942	3.60	.46		1951	1.58	.08
8-10	.13	.00		1945	6.00	.76		1955	1.94	.20
8-11	.03	.00		1953	4.65	1.38		1957	1.99	.26
8-15	.05	.00		1958	2.28	1.57		1959	1.94	.33
8-22	.06	.00		2002	3.00	1.77		2003	1.66	.45
8-23	.58	.00		2010	.60	1.85		2005	1.71	.50
Watershed conditions: 100% sorghum - about 5' high, heads well filled; cultivated on June 29. Crop rotation of sorghum, fallow and wheat.				2015	.12	1.86		2007	1.63	.56
								2011	1.19	.65
								2017	.65	.75
								2021	.42	.78
								2029	.14	.82
								2044	.03	.84
								2055	.01	.84
								2120	.00	.85

Event of October 17, 1963

RG B-36-R			RG B-36-R							
9-20	.82	.03	10-17	0704	.00	.00	10-17	0707	.0000	.0000
9-21	1.32	.70		0716	1.45	.29		0710	.157	T
9-22	.67	.50		0724	.38	.34		0713	.091	.01
9-24	.07	.00		0739	.04	.35		0714	.421	.02
10-17	.57	.00		0744	.72	.41		0715	.566	.02
Watershed conditions: 100% fallow, used tedder on Aug. 5. Crop rotation of fallow, wheat and sorghum.				0754	.18	.44		0717	.421	.04
								0720	.170	.05
								0723	.204	.06
								0727	.062	.07
								0738	.012	.08
								0740	.106	.08
								0741	.421	.08
								0742	.468	.09
								0743	.421	.10
								0752	.087	.14
								0832	.000	.17

Event of June 21, 1964

RG B-36-R				RG	B-34-R					
5-26	.25	.00	6-21	0503	.00	.00	6-21	0507	.0000	.0000
5-27	.40	.00		0506	6.20	.31		0509	.421	.01
6-4	1.05	.00		0510	4.35	.60		0510	1.540	.02
6-11	2.23	.33		0514	4.50	.90		0511	2.160	.05
6-12	.32	.07		0519	1.20	1.00		0514	3.310	.19
6-13	.42	.04		0536	.25	1.07		0516	2.450	.29
6-14	.99	.27						0518	1.400	.35
Watershed conditions: In wheat, all headed out and most heads mature. Nearly ripe but moisture content too high to harvest. 28" to 36" high, in excellent condition with ground cover 85%.			-					0521	.606	.40
								0526	.106	.43
								0531	.026	.44
								0546	.004	.44
								0630	.000	.44

Event of May 21-22, 1965

RG B-36-R			RG B-36-R							
4-24	.71	.01	5-21	2141	.00	.00	5-21	2142	.0000	.0000
5-4	.57	.00		2146	1.32	.11		2148	.01	.00
5-7	.77	.04		2207	4.23	1.59		2158	2.52	.27
5-8	.02	.00		2215	1.35	1.77		2202	2.45	.44
5-14	.71	.02		2229	.60	1.91		2205	3.13	.58
5-17	.20	.00		2239	2.58	2.34		2209	1.78	.74
				2244	3.96	2.67		2219	.83	.96
Watershed conditions: No tillage during spring.				2254	2.52	3.09		2228	.44	1.06
Cover is weeds and wheat stubble.				2304	.96	3.25		2234	1.19	1.14
				2314	.24	3.29		2242	2.11	1.37
				2319	.84	3.36		2248	1.78	1.57
								2254	2.21	1.77
								2309	.54	2.11
								2317	.46	2.18
								2329	.12	2.23
							5-22	0006	.01	2.27
								0056	.00	2.28

SELECTED RUNOFF EVENTS

WATERSHED 3-H (44.07)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
<u>Event of June 12-13, 1965</u>										
RG B-36-R			RG B-36-R							
5-14	.71	.02	6-12	2116	.00	.00	6-12	2119	.0000	.0000
5-17	.20	.00		2129	2.77	.60		2127	1.81	.12
5-21	3.36	2.28		2139	.24	.64		2130	1.49	.21
5-22	4.08	3.05		2149	.84	.78		2140	.42	.37
5-24	1.14	.58		2159	.12	.80		2145	.32	.40
5-25	.15	T		2334	.00	.80		2153	.48	.44
5-31	.07	.00		2347	.83	.98		2200	.27	.49
6-1	1.02	.25		2357	4.20	1.68		2215	.05	.53
6-2	.10	.06	6-13	0004	1.54	1.86		2245	.01	.54
6-5	.32	.00		0147	.04	1.93		2330	.00	.54
6-6	.12	.00						2335	.00	.54
6-9	.78	.07						2345	.04	.54
6-10	.41	.10						2358	2.55	.85
6-11	.09	.00					6-13	0015	.52	1.26
								0030	.09	1.34
Watershed conditions: No tillage during spring. Cover is weeds and wheat stubble.								0100	.01	1.36
								0145	.00	1.36
<u>Event of July 8, 1967</u>										
RG B-36-R			RG B-36-R							
6-9	.42	.01	7-8	0148	.00	.00	7-8	0200	.0000	.0000
6-10	1.10	.36		0155	1.71	.20		0206	.09	.00
6-11	.91	.46		0201	2.50	.45		0212	.09	.01
6-15	.12	.00		0210	1.13	.62		0218	.05	.02
6-20	.44	.00		0215	.48	.66		0222	.07	.02
6-21	1.04	.17		0220	1.56	.79		0230	.02	.03
6-23	.23	.01		0230	.12	.81		0238	.00	.03
6-24	.52	.06		0250	.00	.81		0246	.00	.03
6-28	.20	.00		0305	2.68	1.48		0253	.06	.03
7-4	.06	.00		0320	1.20	1.78		0258	.93	.07
7-5	.08	.00		0400	.03	1.80		0305	2.27	.28
				0430	.20	1.90		0313	.88	.49
				0500	.06	1.93		0325	.22	.59
				0530	.24	2.05		0337	.03	.61
				0640	.02	2.07		0400	.00	.62
Watershed conditions: In wheat, ripe. 24" to 48" high in good condition with ground cover 75%.										
			RG	B-34-R	2.10					

SELECTED RUNOFF EVENTS

A75

WATERSHED 4-H (44.08)

ANTECEDENT CONDITION

RAINFALL

RUNOFF

Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
<u>Event of July 18-19, 1958</u>										
6-20	.30	.00	7-18	RG	B-36-R		7-18	2331	.0000	.0000
6-25	.20	.00		2328	.00	.00		2334	.0604	T
7-3	.95	.00		2330	.30	.01		2336	1.09	.02
7-4	.38	.00		2334	4.35	.30		2337	1.05	.04
7-10	.42	T		2336	3.90	.43		2338	.930	.06
7-12	.08	.00	7-19	2341	1.32	.54		2341	.581	.10
7-15	.31	.00		2343	3.90	.67		2343	.783	.12
7-16	.08	.00		2348	.48	.71		2344	1.25	.13
7-17	1.07	.04		0048	.01	.72		2346	.752	.17
								2348	.413	.19

Watershed conditions:
sorghum about 1' high,
in good condition.
Crop was replanted
about June 27. Went
over the field with a
tedder on July 8.

2350	.200	.20
2355	.0765	.21
2357	.0765	.21
0003	.0346	.22
0033	.0105	.22
0130	.0000	.23

Event of May 4, 1959

4-10	.02	.00	5-4	RG	B-36-R		5-4	1425	.0000	.0000
4-17	.34	.00		1418	.00	.00		1427	.243	T
4-19	.51	.03		1420	.90	.03		1429	1.23	.03
5-2	.25	.00		1422	2.10	.10		1431	.997	.07
5-3	.14	.00		1424	3.60	.22		1435	.461	.11
				1426	5.40	.40				
				1428	3.60	.52		1439	.196	.13
				1430	2.40	.60		1442	.110	.14
				1432	1.20	.64		1445	.0637	.15
				1507	.19	.75		1452	.0236	.15
				1527	.03	.76		1509	.0095	.16
				1630	.00	.76		1549	.0051	.16
				1750	.06	.84		1749	.0000	.16

Watershed conditions:
Fallow good residue
cover.

Event of May 15-16, 1960

4-16	.20	.00	5-15	RG	B-36-R		5-15	2120	.0000	.0000
4-25	.11	.00		2054	.00	.00		2130	.002	T
4-27	.07	.00		2104	.96	.16		2150	.0425	T
4-28	.08	.00		2114	.24	.20		2154	.485	.02
4-29	.29	.00		2140	.09	.24		2157	3.17	.10
				2144	.60	.28				
5-3	.18	.00		2152	1.73	.51		2203	1.11	.28
5-5	1.61	.56		2156	3.90	.77		2210	6.08	.64
5-6	.14	.00		2202	1.90	.96		2215	.962	.95
				2210	4.73	1.59		2219	.260	.97
				2216	.60	1.65		2224	2.17	1.08
				2222	1.60	1.81		2230	3.46	1.35
				2228	3.00	2.11		2233	1.59	1.4655
				2232	2.55	2.28		2235	.506	1.50
				2252	.15	2.33		2239	.275	1.53
								2245	.132	1.55
								2315	.0308	1.58
							5-16	0055	.0000	1.60

Watershed conditions: 100%
wheat, 12" high and starting
to head, good condition.
60% ground cover.

Event of August 11, 1961

7-13	.27	.00	8-11	RG	B-36-R		8-11	0027	.0000	.0000
7-18	.17	.00		0026	.00	.00		0035	.002	.0002
7-20	.32	.00		0038	3.70	.74		0036	.204	T
7-21	.05	.00		0042	.30	.76		0038	.714	.02
7-22	.18	.00		0052	4.44	1.50		0041	.559	.05
				0100	.82	1.61				
7-26	.13	.00		0130	.18	1.70		0043	1.59	.08
8-1	.21	.00		0150	.03	1.71		0045	2.91	.15
8-4	.06	.00						0047	3.17	.25
								0048	2.84	.303
								0050	1.81	.38
								0052	1.08	.43
								0057	.37	.48
								0100	.169	.50
								0105	.076	.507
								0115	.0256	.51
								0200	.0000	.52

Watershed conditions: 100%
sorghum, 3-1/2' high, head-
ing and in good condition.
Field cultivated 7/26/61;
55% density.

SELECTED RUNOFF EVENTS

WATERSHED 4-H (44.08)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
<u>Event of August 23, 1962</u>										
RG B-36-R			RG B-36-R				8-23 1930 .0000 .0000			
7-26	.07	.00	8-23	1920	.00	.00	1940			
7-27	.65	.04		1926	.70	.07	1945	2.54	.11	T
7-29	.06	.00		1934	.00	.07	1947	5.48	.24	
8-2	.17	.00		1937	1.80	.16	1948	4.41	.32	
8-4	.51	.07		1942	3.60	.46				
8-10	.13	.00		1945	6.00	.76	1951	5.29	.56	
8-11	.03	.00		1953	4.65	1.38	1955	3.49	.86	
8-15	.05	.00		1958	2.28	1.57	1957	1.67	.94	
8-22	.06	.00		2002	3.00	1.77	2001	2.24	1.07	
8-23	.58	.00		2010	.60	1.85	2003	2.29	1.15	
Watershed conditions:			2015	.12	1.86		2005	1.34	1.21	
Watershed in fallow;							2010	.39	1.28	
ground worked with sub-							2015	.13	1.30	
tiller and tedder 30							2020	.05	1.31	
days before event.							2030	.02	1.32	
							2045	.01	1.32	
							2115	.00	1.32	

Event of September 10, 1963

RG Met. Sta.			RG B-31-R				9-10 0110 .0000 .0000			
8-12	.58	.00	9-10	0040	.00	.00	0117	.042		T
8-17	.14	.00		0100	.12	.04	0130	.046	.01	
8-18	.84	T		0103	.80	.08	0140	.036	.02	
8-23	.24	.00		0111	.23	.11	0155	.056	.03	
8-27	.05	.00		0119	.75	.21				
9-1	1.86	.04		0131	.30	.27	0158	.094	.03	
9-4	.49	.01		0150	.16	.32	0201	.234	.04	
9-7	.12	.00		0203	.28	.38	0203	.268	.05	
9-9	2.12	.67		0207	1.50	.48	0207	.436	.07	
				0218	1.53	.76	0211	.600	.11	
Watershed conditions: 100%				0226	1.13	.91	0215	.572	.15	
wheat, combined on June 24,				0248	.22	.99	0220	.776	.20	
with a yield of 30 bushels				0340	.05	1.03	0223	.627	.24	
per acre. Crop rotation of							0228	.436	.28	
wheat, sorghum and fallow.							0236	.243	.33	
			RG Met. Sta. Total				0250	.094	.37	
				0057	.00		0310	.049	.39	
				0350	1.06		0340	.021	.41	
							0410	.008	.42	
							0510	.000	.42	

Event of June 21, 1964

RG B-36-R			RG B-34-R				6-21 0509 .0000 .0000			
5-26	.25	.00	6-21	0503	.00	.00	0512	2.540	.06	
5-27	.40	.00		0506	6.20	.31	0517	4.550	.36	
6-4	1.05	.00		0510	4.35	.60	0520	2.540	.54	
6-11	2.23	1.45		0514	4.50	.90	0525	.730	.67	
6-12	.32	.20		0519	1.20	1.00				
6-13	.42	.18		0536	.25	1.07	0528	.294	.70	
6-14	.99	.64					0533	.081	.71	
Watershed conditions: In				RG B-36-R	1.02		0553	.013	.73	
mulo, 6" to 10" high and							0640	.000	.74	
in excellent condition.										
No tillage operations										
since planting on May 18.										
Sprayed with atrazine										
June 11 for weed control.										
Ground cover 8%.										

Event of June 12-13, 1965

RG B-36-R			RG B-36-R				6-12 2115 .0000 .0000			
5-14	.71	.00	6-12	2116	.00	.00	2118	.44	.01	
5-17	.20	.00		2129	2.77	.60	2122	2.42	.12	
5-21	3.36	.00		2139	.24	.64	2128	1.34	.31	
5-22	4.08	.00		2149	.84	.78	2134	.44	.38	
5-24	1.14	.00		2159	.12	.80				
5-25	.15	.00		2334	.00	.80	2140	.25	.42	
5-31	.07	.00		2347	.83	.98	2148	.59	.47	
Watershed conditions: No				2357	4.20	1.68	2151	.44	.50	
tillage during spring.			6-13	0004	1.54	1.86	2208	.10	.56	
Cover is weeds and sorghum				0147	.04	1.93	2300	.00	.60	
stubble.				RG B-34-R	1.86		2335	.00	.60	
							2342	.44	.62	
							2344	.86	.64	
							2346	.79	.67	
							2350	2.54	.78	
							2354	3.82	1.00	
							2400	1.64	1.26	
			6-13	0011	.44	1.42				
				0100	.00	1.54				

SELECTED RUNOFF EVENTS

WATERSHED 4-H (44.08)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
<u>Event of June 29, 1965</u>										
	RG B-36-R			RG	B-36-R					
5-31	.07	.00	6-29	2235	.00	.00	6-29	2244	.0000	.0000
6-1	1.02	.57		2240	4.92	.41		2247	3.19	.08
6-2	.10	.05		2248	2.03	.68		2251	2.24	.25
6-5	.32	T		2255	.34	.72		2257	1.46	.44
6-6	.12	T						2303	.44	.53
				RG	B-34-R	.82				
6-9	.78	.19						2308	.13	.56
6-10	.41	.14						2314	.09	.57
6-11	.09	.02						2400	.00	.60
6-12	1.80	1.26								
6-13	.13	.28								
6-21	.37	.00								
6-22	.21	.00								
6-24	.39	.00								
6-25	.22	.04								
6-26	.31	.06								
6-28	.39	.10								

Watershed conditions: No
tillage during spring.
Cover weeds and sorghum
stubble.

Event of July 8, 1967

	RG B-36-R			RG	B-36-R					
6-9	.43	.00	7-8	0148	.00	.00	7-8	0153	.0000	.0000
6-10	1.11	.00		0155	1.71	.20		0200	.83	.05
6-11	.90	.00		0201	2.50	.45		0204	.36	.09
6-15	.18	.00		0210	1.13	.62		0207	.61	.12
6-20	.35	.00		0215	.48	.66		0213	.29	.16
6-21	1.11	.00		0220	1.56	.79		0217	.79	.20
6-23	.15	.00		0230	.12	.81		0227	.18	.26
6-24	.55	.00		0250	.00	.81		0237	.03	.28
6-28	.16	.00		0305	2.68	1.48		0249	.01	.28
7-4	.04	.00		0320	1.20	1.78		0254	1.15	.31
7-5	.06	.00		0400	.03	1.80		0303	2.54	.56
				0430	.20	1.90		0308	1.36	.72
				0500	.06	1.93		0319	.46	.89
				0530	.24	2.05		0334	.17	.95
				0640	.02	2.07		0344	.12	.98
								0354	.08	.99
								0415	.05	1.01
								0424	.04	1.02
								0429	.08	1.02
								0502	.02	1.05
								0507	.13	1.05
								0512	.08	1.06
								0516	.10	1.07
								0526	.07	1.08
								0536	.02	1.09
								0706	.00	1.09

Watershed conditions: In
sorghum, 2" to 10" high
and in good condition.
Ground cover 5%.

SELECTED RUNOFF EVENTS

A78

WATERSHED 5-H (44.09)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
<u>Event of June 12-13, 1958</u>										
				RG	B-36-R					
5-14	.52	.01	6-12	2345	.00	.00	6-12	2350	.0000	.0000
5-15	.22	.00		2347	1.50	.05		2352	.0787	T
5-16	.25	T		2349	3.00	.15		2354	.469	.01
5-26	.30	.00		2351	2.10	.22		2356	.265	.02
5-27	.15	.00		2355	.15	.23		2358	.156	.03
6-6	.12	.00						2400	.111	.03
6-12	1.72	.19					6-13	0004	.0522	.04
								0012	.0154	.04
								0055	.0000	.05
Watershed conditions: Fallow - last field operation May 22 with the 7' sweep to kill weeds. Little cover at time of storm.										

Event of May 4, 1959

				RG	B-36-R					
4-10	.02	.00	5-4	1418	.00	.00	5-4	1420	.0000	.0000
4-17	.34	.00		1420	.90	.03		1422	.0189	
4-19	.51	.02		1422	2.10	.10		1424	.119	T
5-2	.25	.00		1424	3.60	.22		1426	.471	.01
5-3	.14	.00		1426	5.40	.40		1427	.531	.02
				1428	3.60	.52		1428	.531	.03
				1430	2.40	.60		1431	.395	.05
				1432	1.20	.64		1433	.395	.07
				1507	.19	.75		1439	.235	.10
				1527	.03	.76		1444	.136	.11
								1449	.0651	.12
								1454	.0279	.13
								1534	.0000	.13

Watershed conditions:
Wheat 6" high and in
good condition.

Event of July 3, 1959

				RG	B-36-R					
6-18	.05	.00	7-3	2031	.00	.00	7-3	2032	.0000	.0000
6-19	.37	.00		2033	3.00	.10		2034	.0578	T
6-20	1.31	.02		2037	5.70	.48		2036	.508	.01
6-21	.03	.00		2039	8.10	.75		2039	2.64	.09
6-28	1.93	.42		2041	7.50	1.00		2041	3.03	.19
6-29	.19	T		2043	5.10	1.17		2043	3.50	.30
6-30	.22	.00		2049	2.50	1.42		2045	3.35	.41
				2052	2.00	1.52		2047	2.96	.52
				2055	3.20	1.68		2049	2.34	.60
				2101	2.00	1.88		2052	2.25	.72
				2109	3.30	2.32		2056	1.92	.86
				2111	2.40	2.40		2059	1.77	.95
				2114	3.60	2.58		2102	2.10	1.05
				2116	1.50	2.63		2104	1.90	1.11
								2106	2.30	1.18
								2107	2.34	1.22
								2109	2.13	1.30
								2111	2.45	1.37
								2113	2.22	1.45
								2120	1.10	1.64
								2124	.620	1.70
								2128	.284	1.73
								2130	.249	1.74
								2139	.0770	1.76
								2153	.0116	1.77
								2304	.000	1.81

Watershed conditions:
Wheat 3' high. Ripe and
ready to cut. Good stand.

SELECTED RUNOFF EVENTS

WATERSHED 5-H (44.09)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	F (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
<u>Event of May 15-16, 1960</u>										
				RG	B-36-R					
4-16	.20	.00	5-15	2054	.00	.00	5-15	2159	.0000	.0000
4-25	.11	.00		2104	.96	.16		2205	.427	.02
4-27	.07	.00		2114	.24	.20		2209	.972	.06
4-28	.08	.00		2140	.09	.24		2213	1.36	.14
4-29	.29	.00		2144	.60	.28		2217	1.72	.25
5-3	.18	.00		2152	1.73	.51		2222	2.05	.40
5-5	1.61	.02		2156	3.90	.77		2225	2.82	.49
5-6	.14	.00		2202	1.90	.96		2227	3.43	.62
Watershed conditions: 100% sorghum, not yet planted on 5/15/60. Duckfoot soil saver used on 5/11/60, tedder on 5/13/60. One half of wheat stubble on surface.				2210	4.73	1.59		2230	2.39	.77
				2216	.60	1.65		2234	1.15	.88
				2222	1.60	1.81		2241	.427	.96
				2228	3.00	2.11		2247	.212	.99
				2232	2.55	2.28		2257	.119	1.02
				2252	.15	2.33		2317	.042	1.04
							5-16	0116	.0000	1.06

Event of August 11, 1961

				RG	B-36-R					
7-13	.27	.00	8-11	0026	.00	.00	8-11	0034	.0000	.0000
7-18	.17	.00		0038	3.70	.74		0036	.395	.01
7-20	.32	.00		0042	.30	.76		0038	.607	.03
7-21	.05	.00		0052	4.44	1.50		0040	.543	.04
7-22	.18	.00		0100	.82	1.61		0043	1.42	.09
7-26	.13	.00		0130	.18	1.70		0046	2.77	.20
8-1	.21	.00		0150	.03	1.71		0050	1.34	.34
8-4	.06	.00						0054	.703	.40
Watershed conditions: 100% fallow. Last field operation on 7/26/61, used 7' sub-surface tiller 5" deep.								0056	.459	.42
								0058	.345	.43
								0100	.165	.44
								0103	.109	.45
								0119	.038	.47
								0334	.0000	.48

Event of August 23, 1962

	RG B-36-R			RG	B-36-R					
7-26	.07	.00	8-23	1920	.00	.00	8-23	1935	.0000	.0000
7-27	.65	.00		1926	.70	.07		1941	T	T
7-29	.06	.00		1934	.00	.07		1947	.48	.02
8-2	.17	.00		1937	1.80	.16		1951	.38	.04
8-4	.51	T		1942	3.60	.46		1955	.57	.06
8-10	.13	.00		1945	6.00	.76		1957	.48	.10
8-11	.03	.00		1953	4.65	1.38		2000	.69	.13
8-15	.05	.00		1958	2.28	1.57		2005	.58	.18
8-22	.06	.00		2002	3.00	1.77		2010	.40	.22
8-23	.58	.00		2010	.60	1.85		2020	.14	.27
Watershed conditions: 100% wheat; combined on July 3 with a yield of 23 bu. per acre and a good residue left on the ground. Crop rotation of winter wheat, sorghum and fallow.				2015	.12	1.86		2035	.04	.30
								2115	T	.30
								2155	.00	.30

Event of September 10, 1963

	RG Met. Sta.			RG	B-31-R					
8-12	.58	.00	9-10	0040	.00	.00	9-10	0052	.0000	.0000
8-17	.14	.00		0100	.12	.04		0054	.069	T
8-18	.84	T		0103	.80	.08		0058	.042	T
8-23	.24	.00		0111	.23	.11		0105	.119	.01
8-27	.05	.00		0119	.75	.21		0107	.141	.01
9-1	1.86	.04		0131	.30	.27		0109	.192	.02
9-4	.49	.02		0150	.16	.32		0112	.119	.03
9-7	.12	.00		0203	.28	.38		0117	.077	.04
9-9	2.12	.66		0207	1.50	.48		0122	.095	.05
Watershed conditions: 100% sorghum; cultivated on June 29. Crop rotation of sorghum, fallow, and wheat.				0218	1.53	.76		0131	.048	.06
				0226	1.13	.91		0139	.095	.07
				0248	.22	.99		0141	.077	.07
				0340	.05	1.03		0145	.086	.08
				RG Met. Sta.				0150	.077	.08
				0057		.00		0153	.171	.09
				0350		1.06		0155	.301	.10
								0200	.395	.13
								0205	.718	.17
								0210	.580	.23
								0214	.904	.28
								0225	.395	.40
								0238	.153	.46
								0255	.058	.49
								0335	.0000	.51

SELECTED RUNOFF EVENTS

WATERSHED 5-H (44.09)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
<u>Event of July 26, 1964</u>										
RG B-36-R			RG B-36-R							
7-1	.45	T	7-26	1644	.00	.00	7-26	1649	.0000	.0000
7-7	.29	.00		1651	6.69	.78		1652	.099	T
7-8	.11	.00		1655	4.35	1.07		1653	.395	.01
7-10	.50	.00		1658	4.20	1.28		1655	1.570	.04
7-11	.17	.00						1658	2.300	.14
7-26	.09	.00						1701	1.790	.24
Watershed conditions: In fallow, using sub-surface, modified minimum tillage practices. A sub-surface tillage sweep used on July 20 followed by a tedder on July 21. No weed growth; an estimated 10% ground cover of milo stalks left on surface on July 26th.								1704	1.110	.31
								1707	.439	.35
								1710	.249	.37
								1718	.065	.39
								1730	.015	.40
								1745	.002	.40
								1800	.000	.40

Event of May 21, 1965

RG B-36-R			RG B-36-R							
4-24	.71	.00	5-21	2141	.00	.00	5-21	2141	.0000	.0000
5-4	.57	.00		2146	1.32	.11		2146	.08	.00
5-7	.77	.03		2207	4.23	1.59		2150	1.53	.06
5-8	.02	.00		2215	1.35	1.77		2156	2.45	.26
5-14	.71	.03		2229	.60	1.91		2157	2.30	.29
5-17	.20	.00		2239	2.58	2.34		2202	3.24	.53
Watershed conditions: In wheat. 12" to 24" high, in good condition with ground cover 85%.				2244	3.96	2.67		2206	2.30	.71
				2254	2.52	3.09		2214	1.15	.94
				2304	.96	3.25		2220	.84	1.03
				2314	.24	3.29		2227	.42	1.10
				2319	.84	3.36		2233	.97	1.17
								2235	.11	1.19
								2243	2.45	1.39
								2247	1.98	1.54
								2252	2.30	1.72
								2300	1.32	1.96
								2305	.90	2.05
								2312	.41	2.11
								2318	.40	2.16
								2330	.21	2.22
								2400	.05	2.28
								5-22 0028	.02	2.29
								0128	.00	2.33

Event of June 12-13, 1965

RG B-36-R			RG	B-36-R						
5-14	.71	.03	6-12	2116	.00	.00	6-12	2116	.0000	.0000
5-17	.20	.00		2129	2.77	.60		2121	.40	.01
5-21	3.36	2.28		2139	.24	.64		2128	.84	.08
5-22	4.08	3.48		2149	.84	.78		2133	1.17	.17
5-24	1.14	.60		2159	.12	.80		2138	.78	.25
5-25	.15	T		2334	.00	.80		2144	.28	.30
5-31	.07	.00		2347	.83	.98		2151	.20	.33
6-1	1.02	.25	6-13	2357	4.20	1.68		2200	.18	.36
6-2	.10	.03		0004	1.54	1.86		2210	.03	.38
6-5	.32	.00		0147	.04	1.93		2220	.00	.38
6-6	.12	.00								
6-9	.78	.05		RG	B-34-R			1.86	2338	.00	.38
6-10	.41	.07						2346	.27	.39
6-11	.09	.00						2350	.40	.41
								2357	1.17	.50
Watershed conditions: In wheat. 18" to 30" high, in good condition with ground cover 85%.							6-13	0002	2.48	.64
								0007	1.11	.78
								0013	.40	.86
								0027	.03	.90
								0052	.00	.90

SELECTED RUNOFF EVENTS

WATERSHED 5-H (44.09)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
Event of July 8, 1967										
	RG B-36-R			RG	B-36-R					
6-9	.43	.01	7-8	0148	.00	.00	7-8	0253	.0000	.0000
6-10	1.11	.07		0155	1.71	.20		0301	.61	.03
6-11	.90	.25		0201	2.50	.45		0308	1.27	.16
6-15	.18	.00		0210	1.13	.62		0313	.78	.23
6-20	.35	.00		0215	.48	.66		0320	.43	.30
6-21	1.11	T		0220	1.56	.79		0330	.11	.34
6-23	.15	.00		0230	.12	.81		0340	.06	.35
6-24	.55	T		0250	.00	.81		0355	.03	.36
6-28	.16	.00		0305	2.68	1.48		0415	.01	.37
7-4	.04	.00		0320	1.20	1.78		0445	.00	.37
7-5	.06	.00		0400	.03	1.80				
				0430	.20	1.90				
				0500	.06	1.93				
				0530	.24	2.05				
				0640	.02	2.07				
Watershed conditions: In fallow, using minimum tillage practices. Estimated ground cover 10%.				RG	B-34-R	2.10				

Watershed conditions: In
fallow, using minimum
tillage practices. Esti-
mated ground cover 10%.

SELECTED RUNOFF EVENTS

WATERSHED 6-H (44.10)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
<u>Event of June 27, 1956</u>										
				RG	B-36-R					
5-31	.21	.00	6-27	1010	.00	.00	6-27	1012	.0000	.0000
6-6	.22	.00		1014	1.35	.09		1015	.0183	T
6-7	.76	.00		1018	3.45	.32		1017	.136	T
6-19	.04	.00		1022	2.10	.46		1018	.257	.01
6-21	.11	.00		1026	1.50	.56		1020	1.39	.04
6-22	.09	.00		1105	.06	.60		1021	1.46	.06
6-25	.14	.00						1022	1.48	.09
6-26	1.56	.45						1023	1.46	.11
Watershed conditions: Corn 2' high in fair condition.								1025	1.27	.16
								1028	.873	.21
								1032	.455	.25
								1037	.154	.28
								1040	.0827	.28
								1050	.0164	.29
								1105	.0056	.29
<u>Event of June 12-13, 1958</u>										
				RG	B-36-R					
5-14	.52	.01	6-12	2345	.00	.00	6-12	2349	.0000	.0000
5-15	.22	.00		2347	1.50	.05		2350	.0145	T
5-16	.25	.02		2349	3.00	.15		2352	.381	.01
5-26	.30	.00		2351	2.10	.22		2353	.424	.01
5-27	.15	.00		2355	.15	.23		2354	.381	.02
6-6	.12	.00						2357	.125	.03
6-12	1.72	.14						2359	.0706	.03
Watershed conditions: Fallow last field operation May 22 with the 7' sweep to kill weeds. Very little cover.							6-13	0002	.0401	.04
								0007	.0183	.04
								0014	.0083	.04
								0040	.0000	.04
<u>Event of July 3, 1959</u>										
				RG	B-36-R					
6-18	.05	.00	7-3	2031	.00	.00	7-3	2031	.0000	.0000
6-19	.37	.00		2033	3.00	.10		2032	.0086	T
6-20	1.31	.03		2037	5.70	.48		2033	.160	T
6-21	.03	.00		2039	8.10	.75		2037	2.08	.07
6-28	1.93	.39		2041	7.50	1.00		2038	2.67	.11
6-29	.19	T		2043	5.10	1.17		2041	3.16	.26
6-30	.22	.00		2049	2.50	1.42		2042	3.24	.31
Watershed conditions: Wheat 3' high ripe and ready to harvest. Good stand.				2052	2.00	1.52		2044	3.14	.42
				2055	3.20	1.68		2050	2.08	.68
				2101	2.00	1.88		2053	2.00	.78
				2109	3.30	2.32		2058	1.65	.93
				2111	2.40	2.40		2059	1.65	.96
				2114	3.60	2.58		2101	1.87	1.02
				2116	1.50	2.63		2103	1.81	1.08
								2106	2.08	1.17
								2107	2.08	1.21
								2109	2.02	1.28
								2111	2.17	1.35
								2112	2.14	1.38
								2116	1.42	1.50
								2119	.957	1.56
								2123	.532	1.61
								2125	.395	1.62
								2131	.153	1.65
								2137	.0445	1.66
								2204	.0000	1.66
<u>Event of May 15-16, 1960</u>										
				RG	B-36-R					
4-16	.20	.00	5-15	2054	.00	.00	5-15	2202	.0000	.0000
4-25	.11	.00		2104	.96	.16		2204	.507	T
4-27	.07	.00		2114	.24	.20		2205	1.10	.02
4-28	.08	.00		2140	.09	.24		2207	1.63	.06
4-29	.29	.00		2144	.60	.28		2209	2.30	.13
5-3	.18	.00		2152	1.73	.51		2210	2.89	.17
5-5	1.61	.03		2156	3.90	.77		2211	2.30	.22
5-6	.14	.00		2202	1.90	.96		2213	1.95	.28
Watershed conditions: 100% sorghum, not yet planted on 5/15/60. Duckfoot soil saver used on 5/11/60, Tedder on 5/13/60. One half of wheat stubble on surface.				2210	4.73	1.59		2216	1.53	.37
				2216	.60	1.65		2221	1.85	.50
				2222	1.60	1.81		2224	1.74	.59
				2228	3.00	2.11		2228	2.79	.74
				2232	2.55	2.28		2232	1.51	.89
				2252	.15	2.33		2234	.973	.93
								2236	.636	.96
								2238	.440	.98
								2242	.267	1.00
								2245	.243	1.013
								2247	.227	1.02
								2257	.160	1.05
								2327	.090	1.11
								0001	.054	1.15
								0227	.000	1.20

SELECTED RUNOFF EVENTS

WATERSHED 6-H (44.10)

ANTECEDENT CONDITION

RAINFALL

RUNOFF

Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
<u>Event of June 14-15, 1960</u>										
5-15	2.33	1.28	6-14	RG	B-36-R		6-14	2307	.0000	.0000
5-16	.06	.05		2301	.00	.00		2310	.099	.01
5-18	1.11	.65		2305	1.50	.10		2313	.440	.08
5-19	.25	.17		2311	1.80	.28		2315	3.61	.18
5-20	.17	.02		2315	5.40	.64		2317	2.49	.27
				2317	4.20	.78				
5-26	.03	.00		2323	.30	.81		2320	1.34	.33
5-28	.04	.00		2338	.12	.84		2324	.596	.37
6-4	.37	.00						2330	.260	.40
6-8	.35	.00						2340	.0947	.41
6-9	.88	.14						2350	.0331	.413
6-11	.78	.17						2357	.0186	.4146

Watershed conditions: 100% sorghum, 1" to 2" high, last field operation (tedder) on 5/25/60 following seeding on 5/24/60. Good cover.

Event of August 23, 1962

7-26	RG B-36-R	.07	.00	8-23	RG	B-36-R	.00	8-23	1947	.0000	.0000
7-27		.65	.00		1920	.00	.07		1952	.21	.01
7-29		.06	.00		1926	.70	.07		1957	.39	.03
8-2		.17	.00		1934	.00	.16		2002	.41	.07
8-4		.51	.00		1937	1.80	.46		2006	.48	.10
					1942	3.60	.76				
8-10		.13	.00		1945	6.00	1.38		2010	.38	.14
8-11		.03	.00		1953	4.65	1.57		2012	.31	.16
8-15		.05	.00		1958	2.28	1.77		2017	.18	.17
8-22		.06	.00		2002	3.00	1.85		2022	.12	.19
8-23		.58	.00		2010	.60			2032	.05	.20
					2015	.12	1.86		2047	.02	.20
									2117	.01	.21
									2147	.00	

Watershed conditions: 100% wheat; combined on July 3 with a yield of 23 bu. per acre and a good residue left on the ground. Crop rotation of winter wheat, sorghum and fallow.

Event of September 9, 1963

8-12	RG Met. Sta.	.58	.00	9-9	RG	Met. Sta.	.00	9-9	1520	.0000	.0000
8-17		.14	.00		1518	.00	.12		1525	.450	.02
8-18		.84	.00		1528	.72	.28		1530	.302	.05
8-23		.24	.00		1535	1.37	.47		1536	.704	.10
8-27		.05	.00		1539	2.85	.51		1536	.704	.14
					1546	.34	.67		1540	.395	.16
9-1		1.86	.02		1549	3.20	1.14		1544	.192	.24
9-4		.49	.02		1554	5.64	1.20		1550	1.530	.33
9-7		.12	.00		1556	1.80	1.29		1553	2.020	.39
9-9		.65	.03		1606	.54	1.35		1555	1.580	.48
					1610	.90			1600	.484	.51
					1614	.60	1.39		1605	.356	.55
					1634	.24	1.47		1610	.418	.57
									1615	.250	.59
									1620	.141	.60
									1625	.081	.61
									1635	.036	.61
									1645	.012	.61
									1700	.003	.61
									1730	.0000	.61

Watershed conditions: 100% sorghum, cultivated on July 18. Crop rotation of sorghum, fallow and wheat.

Event of June 21, 1964

5-26	RG B-36-R	.25	.00	6-21	RG	B-34-R	.00	6-21	0508	.0000	.0000
5-27		.40	.00		0503	.00	.31		0511	1.140	.03
6-4		1.05	.00		0506	6.20	.60		0514	1.340	.09
6-11		2.23	.18		0510	4.35	.90		0517	.890	.15
6-12		.32	.04		0514	4.50	1.00		0520	.395	.18
					0519	1.20					
6-13		.42	.03		0536	.25	1.07		0523	.319	.20
6-14		.99	.15						0526	.104	.21
									0534	.023	.21
									0604	.0000	.22

Watershed conditions: In fallow; sub-surface tillage sweep on June 3. Small weed growth starting after rains of June 12 to 15. Ground cover of 5 to 15% milo residue. Moderate erosion on the steeper slopes.

SELECTED RUNOFF EVENTS

WATERSHED 6-H (44.10)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
<u>Event of June 12-13, 1965</u>										
RG B-36-R			RG B-36-R							
5-14	.71	T	6-12	2116	.00	.00	6-12	2120	.0000	.0000
5-17	.20	.00		2129	2.77	.60		2123	1.08	.03
5-21	3.36	2.44		2139	.24	.64		2128	1.36	.13
5-22	4.08	3.44		2149	.84	.78		2133	.69	.22
5-24	1.14	.48		2159	.12	.80		2136	.40	.25
5-25	.15	T		2334	.00	.80		2142	.19	.27
5-31	.07	.00		2347	.83	.98		2150	.27	.30
6-1	1.02	.28		2357	4.20	1.68		2200	.09	.33
6-2	.10	.02	6-13	0004	1.54	1.86		2210	.01	.34
6-5	.32	T		0147	.04	1.93		2230	.00	.35
6-6	.12	T						2339	.00	.35
6-9	.78	.07						2343	.06	.35
6-10	.41	.03						2349	.40	.37
6-11	.09	.00						2354	.84	.43
								2400	2.43	.62
Watershed conditions: In wheat, 70% headed. 20" to 32" high, in good condition with ground cover 85%.							6-13	0008	1.19	.88
								0012	.40	.93
								0017	.22	.95
								0022	.09	.97
								0032	.02	.97
								0100	.00	.98

Event of June 29, 1965

RG B-36-R			RG B-36-R							
5-31	.07	.00	6-29	2235	.00	.00	6-29	2239	.0000	.0000
6-1	1.02	.28		2240	4.92	.41		2242	.40	.01
6-2	.10	.02		2248	2.03	.68		2246	1.07	.06
6-5	.32	T		2255	.34	.72		2248	1.01	.10
6-6	.12	T						2250	1.01	.13
6-9	.78	.07						2252	1.10	.16
6-10	.41	.03						2256	.81	.23
6-11	.09	.00						2258	.64	.25
6-12	1.80	.62						2302	.40	.29
6-13	.13	.36						2310	.08	.31
6-21	.37	.00						2320	.01	.32
6-22	.21	.00						2350	.00	.32
6-24	.39	.00								
6-25	.22	T								
6-26	.31	.01								
6-28	.39	.00								

Watershed conditions: In wheat, ripe. 24" to 36" high in poor condition with ground cover 60%.

Event of July 8, 1967

RG B-36-R			RG B-36-R							
6-9	.43	.02	7-8	0148	.00	.00	7-8	0253	.0000	.0000
6-10	1.11	.13		0155	1.71	.20		0257	.24	.00
6-11	.90	.19		0201	2.50	.45		0302	.81	.05
6-15	.18	.00		0210	1.13	.62		0305	.48	.09
6-20	.35	.00		0215	.48	.66		0308	.25	.11
6-21	1.11	.01		0220	1.56	.79		0311	.37	.12
6-23	.15	.00		0230	.12	.81		0315	.24	.14
6-24	.55	T		0250	.00	.81		0321	.07	.15
6-28	.16	.00		0305	2.68	1.48		0328	.04	.16
7-4	.04	.00		0320	1.20	1.78		0338	.02	.17
7-5	.06	.00		0400	.03	1.80		0406	.01	.17
				0430	.20	1.90		0411	.04	.17
				0500	.06	1.93		0422	.01	.18
				0530	.24	2.05		0426	.02	.18
				0640	.02	2.07		0439	.00	.18
								0459	.00	.18
								0504	.07	.18
								0510	.03	.19
								0517	.03	.19
								0529	.00	.20
								0703	.00	.20

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
<u>Event of July 18-19, 1958</u>										
				RG	B-36-R					
6-20	.20	.00	7-18	2328	.00	.00	7-18	2333	.00	.00
6-25	.20	.00		2330	.30	.01		2337	.166	T
7-3	.95	.00		2334	4.35	.30		2342	.641	.04
7-4	.38	.00		2336	3.90	.43		2347	.782	.10
7-10	.42	T		2341	1.32	.54		2349	.576	.12
7-12	.08	.00		2343	3.90	.67		2351	.413	.14
7-15	.31	.00		2348	.36	.70		2355	.265	.16
7-16	.08	.00	7-19	0048	.02	.72		2358	.206	.17
7-17	1.07	.06		0150	.00	.72	7-19	0003	.160	.19
				0220	.04	.74		0012	.105	.20
Watershed conditions: sorghum about 1' high in good condition. Was replanted June 27. Last field operation July 8 with tedder.								0027	.0631	.23
								0052	.0373	.25
								0202	.0129	.27
								0222	.0097	.28

Event of May 4, 1959

4-10	.02	.00	5-4	RG	B-36-R		5-4	1420	.0000	.0000
4-17	.34	T		1418	.00	.00		1422	.0178	T
4-19	.51	.01		1420	.90	.03		1427	.372	.01
5-2	.25	.00		1422	2.10	.10		1428	.547	.02
5-3	.14	T		1424	2.60	.22		1430	.720	.04
				1426	5.40	.40				
Watershed conditions: Fallow good residue cover.								1432	.624	.06
				1428	3.60	.52		1435	.372	.09
				1430	2.40	.60		1440	.214	.11
				1432	1.20	.64		1445	.102	.13
				1507	.19	.75		1450	.0419	.13
								1455	.0142	.14
								1506	.0000	.14

Event of July 3, 1959

6-18	.05	.00	7-3	RG	B-36-R		7-3	2031	.0000	.0000
6-19	.37	.00		2031	.00	.00		2033	.0081	T
6-20	1.31	.02		2033	3.00	.10		2035	.207	T
6-21	.03	.00		2037	5.70	.48		2037	2.17	.04
6-28	1.93	.42		2039	8.10	.75		2040	5.56	.23
				2041	7.50	1.00				
6-29	.19	.00		2043	5.10	1.17		2041	5.29	.32
6-30	.22	.01		2049	2.50	1.42		2044	4.10	.56
Watershed conditions: Fallow last field opera- tion June 27 with tedder. Little cover at time of storm.								2047	3.18	.74
				2052	2.00	1.52		2050	2.04	.87
				2055	3.20	1.68		2053	2.42	.98
				2057	1.80	1.74				
				2059	2.40	1.82		2057	2.22	1.13
				2101	1.80	1.88		2059	2.01	1.20
				2104	3.60	2.06		2101	2.42	1.27
				2107	2.60	2.19		2103	2.98	1.37
				2109	3.90	2.32		2104	2.31	1.41
				2111	2.40	2.40		2105	2.40	1.45
				2114	3.60	2.58		2107	3.03	1.54
				2116	1.50	2.63		2111	2.31	1.72
								2112	2.93	1.76
								2113	3.12	1.81
								2114	2.31	1.86
								2116	1.51	1.92
								2118	1.07	1.96
								2123	.258	2.01
								2129	.144	2.03
								2143	.0312	2.05
								2243	.0000	2.06

SELECTED RUNOFF EVENTS

WATERSHED 7-H (44.11)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
<u>Event of May 15-16, 1960</u>										
				RG	B-36-R					
4-16	.20	.00	5-15	2054	.00	.00	5-15	2146	.0000	.0000
4-25	.11	.00		2104	.96	.16		2151	.0178	T
4-27	.07	.00		2114	.24	.20		2155	.354	.02
4-28	.08	.00		2140	.09	.24		2158	1.60	.05
4-29	.29	.00		2144	.60	.28		2201	1.22	.12
5-3	.18	.00		2152	1.73	.51		2203	1.07	.16
5-5	1.61	.47		2156	3.90	.77		2205	1.74	.21
5-6	.14	.01		2202	1.90	.96		2207	2.28	.27
				2210	4.73	1.59		2209	2.93	.36
				2216	.60	1.65		2211	3.63	.47
				2222	1.60	1.81		2213	2.31	.57
				2228	3.00	2.11		2215	1.42	.63
				2232	2.55	2.28		2218	.677	.68
				2252	.15	2.33		2221	1.03	.72
								2224	1.60	.78
								2229	2.42	.92
								2236	.650	1.12
								2241	.275	1.16
								2248	.192	1.19
								2300	.138	1.22
								2333	.0727	1.27
							5-16	0103	.0338	1.35
								0203	.0263	1.38
								1203	.0000	1.49

Watershed conditions: 100%
wheat, 12" high and starting
to head, good condition, 60%
ground cover.

Event of June 14-15, 1960

				RG	B-36-R					
5-15	.00	.08	6-14	2301	.00	.00	6-14	2304	.0000	.0000
5-16	.06	.18		2305	1.50	.10		2309	.112	T
5-18	1.11	.62		2311	1.80	.28		2313	.335	.02
5-19	.25	.14		2315	5.40	.64		2314	2.17	.04
5-20	.17	.01		2317	4.20	.78		2316	2.88	.13
5-26	.03	.00		2323	.30	.81		2317	2.17	.17
5-28	.04	.00		2338	.12	.84		2321	.598	.26
6-4	.37	T						2324	.310	.28
6-8	.35	T						2327	.156	.29
6-9	.88	.02						2329	.102	.30
6-11	.78	T						2332	.0615	.30
							6-15	0020	.0000	.31

Watershed conditions: 100%
wheat, 3' high and all headed
90% density, good condition.

Event of August 23, 1962

	RG	B-36-R		RG	B-36-R					
7-26	.07	.00	8-23	1920	.00	.00	8-23	1935	.0000	.0000
7-27	.65	.01		1926	.70	.07		1945	.01	T
7-29	.06	.00		1934	.00	.07		1947	.37	.01
8-2	.17	.00		1937	1.80	.16		1950	1.05	.04
8-4	.51	.02		1942	3.60	.46		1952	2.17	.11
8-10	.13	.00		1945	6.00	.76		1955	2.96	.22
8-11	.03	.00		1953	4.65	1.38		1957	2.77	.34
8-15	.05	.00		1958	2.28	1.57		2000	2.28	.44
8-22	.06	.00		2002	3.00	1.77		2002	2.34	.54
8-23	.58	.00		2010	.60	1.85		2005	2.17	.63
				2015	.12	1.86		2007	1.36	.71
								2010	1.01	.76
								2012	.68	.79
								2015	.37	.81
								2020	.12	.84
								2030	.03	.85
								2100	T	.85
								2130	.00	.85

Watershed conditions: 100%
fallow; ground worked with
subtiller and tedder July
27. Crop rotation of fallow,
winter wheat and sorghum.

Event of June 21, 1964

	RG	B-36-R		RG	B-34-R					
5-26	.25	.00	6-21	0503	.00	.00	6-21	0506	.0000	.0000
5-27	.40	.00		0506	6.20	.31		0509	.144	T
6-4	1.05	.00		0510	4.35	.60		0512	.624	.02
6-11	2.23	.50		0514	4.50	.90		0516	2.440	.12
6-12	.32	.16		0519	1.20	1.00		0519	1.860	.23
6-13	.42	.08		0536	.25	1.07		0522	1.070	.31
6-14	.99	.40						0525	.573	.35
				RG	B-36-R	1.02		0528	.372	.37
								0535	.150	.40
								0545	.039	.42
								0555	.009	.42
								0625	.0000	.42

Watershed conditions: In
sorghum, planted May 15,
6" to 10" high in excellent
condition. No tillage
operations following plant-
ing. Sprayed with atrazine
(weed killer) on June 11.
Ground cover 8%.

SELECTED RUNOFF EVENTS

WATERSHED 7-H (44.11)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
<u>Event of May 21-22, 1965</u>										
	RG B-36-R			RG	B-36-R					
4-24	.71	.00	5-21	2141	.00	.00	5-21	2141	.0000	.0000
5-4	.57	.00		2146	1.32	.11		2147	.01	.00
5-7	.77	.07		2207	4.23	1.59		2152	.37	.01
5-8	.02	.00		2215	1.35	1.77		2154	1.15	.04
5-14	.71	.01		2229	.60	1.91		2157	.84	.09
5-17	.20	.00		2239	2.58	2.34		2159	.98	.12
				2244	3.96	2.67		2202	.46	.15
				2254	2.52	3.09		2205	1.17	.19
Watershed conditions: No				2304	.96	3.25		2210	1.58	.31
tillage during spring.				2314	.24	3.29		2215	1.36	.43
Cover is weeds and sorghum										
stubble.				2319	.84	3.36		2220	.85	.53
								2226	.50	.59
								2230	.40	.62
								2234	.75	.66
								2240	1.17	.74
								2245	1.71	.86
								2249	1.51	.97
								2254	2.01	1.12
								2300	1.51	1.29
								2307	.82	1.43
								2313	.43	1.49
								2316	.46	1.52
								2322	.17	1.55
								2330	.05	1.56
								2340	.01	1.57
							5-22	0015	.00	1.57
<u>Event of June 12-13, 1965</u>										
	RG B-36-R			RG	B-36-R					
5-14	.71	.01	6-12	2116	.00	.00	6-12	2125	.0000	.0000
5-17	.20	.00		2129	2.77	.60		2128	.37	.01
5-21	3.36	1.57		2139	.24	.64		2131	1.30	.05
5-22	4.08	3.49		2149	.84	.78		2138	.71	.17
5-24	1.14	.28		2159	.12	.80		2142	.51	.21
5-25	.15	.01		2334	.00	.80		2147	.37	.25
5-31	.07	.00		2347	.83	.98		2202	.21	.32
6-1	1.02	.26		2357	4.20	1.68		2210	.09	.34
6-2	.10	.02	6-13	0004	1.54	1.86		2220	.03	.35
6-5	.32	T		0147	.04	1.93		2235	.00	.35
6-6	.12	.00						2343	.00	.35
6-9	.78	.10						2356	.37	.38
6-10	.41	.08						2400	.98	.42
6-11	.09	.01					6-13	0004	2.14	.53
Watershed conditions: No								0013	1.91	.83
tillage during spring. Cover										
is weeds and sorghum stubble.								0017	1.24	.93
								0022	.73	1.01
								0029	.37	1.08
								0040	.10	1.12
								0055	.03	1.14
								0115	.01	1.14
								0150	.00	1.14
<u>Event of July 8, 1967</u>										
	RG B-36-R			RG	B-36-R					
6-9	.43	.02	7-8	0148	.00	.00	7-8	0157	.0000	.0000
6-10	1.11	.18		0155	1.71	.20		0204	.18	.01
6-11	.90	.28		0201	2.50	.45		0212	.10	.03
6-15	.18	.00		0210	1.13	.62		0220	.34	.06
6-20	.35	.00		0215	.48	.66		0228	.11	.09
6-21	1.11	.30		0220	1.56	.79		0233	.05	.10
6-23	.15	T		0230	.12	.81		0243	.02	.10
6-24	.55	.11		0250	.00	.81		0250	.13	.10
6-28	.16	.00		0305	2.68	1.48		0254	.58	.13
7-4	.04	.00		0320	1.20	1.78		0258	1.11	.18
7-5	.06	.00		0400	.03	1.80		0304	2.22	.37
Watershed conditions: In				0430	.20	1.90		0310	1.13	.55
sorghum, 6" to 12" high in				0500	.06	1.93		0318	.61	.68
good condition. Ground				0530	.24	2.05		0323	.32	.72
cover 5%.				0640	.02	2.07		0333	.10	.75
								0338	.05	.76
								0353	.01	.77
								0403	.01	.77
								0412	.05	.77
								0425	.02	.78
								0428	.04	.78
								0438	.03	.79
								0448	.01	.79
								0501	.01	.79
								0500	.10	.80
								0513	.08	.81
								0523	.07	.82
								0533	.02	.83
								0543	.01	.83
								0643	.00	.83

SELECTED RUNOFF EVENTS

WATERSHED 8-H (44.12)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
<u>Event of July 18-19, 1958</u>										
				RG	B-36-R					
6-20	.20	.00	7-18	2328	.00	.00	7-18	2336	.0000	.0000
6-25	.20	.00		2330	.30	.01		2338	.0666	.0000 T
7-3	.95	.00		2334	4.35	.30		2340	.217	.01
7-4	.38	.00		2336	3.90	.43		2343	.248	.02
7-10	.42	.00		2341	1.32	.54		2345	.316	.03
7-12	.31	.00		2343	3.90	.67		2346	.394	.03
7-16	.08	.00		2348	.36	.70		2348	.380	.05
7-17	1.07	.02	7-19	0048	.02	.72		2357	.326	.10
Watershed conditions: Wheat combined July 8; about 6000 lbs. straw residue on ground.										
							7-19	0001	.343	.16
								0005	.308	.14
								0011	.203	.17
								0014	.169	.18
								0017	.133	.18
								0023	.0830	.20
								0030	.0454	.20
								0040	.0154	.21
								0104	.0000	.21

Event of May 15-16, 1960

				RG	B-36-R					
4-16	.20	.00	5-15	2054	.00	.00	5-15	2159	.0000	.0000
4-25	.11	.00		2104	.96	.16		2204	.575	.02
4-27	.07	.00		2114	.24	.20		2206	.712	.04
4-28	.08	.00		2140	.09	.24		2209	1.00	.09
4-29	.29	.00		2144	.60	.28		2213	2.19	.18
5-3	.18	.00		2152	1.73	.51		2216	1.94	.28
5-5	1.61	.12		2156	3.90	.77		2220	1.46	.40
5-6	.14	.00		2202	1.90	.96		2230	1.54	.63
Watershed conditions: 100% fallow, chiseled on 5/12/60; good ground cover.										
				2210	4.73	1.59		2233	1.19	.70
				2216	.60	1.65		2240	.323	.76
				2222	1.60	1.81		2248	.225	.78
				2228	3.00	2.11		2300	.110	.82
				2232	2.55	2.28	5-16	0100	.0000	.85
				2252	.15	2.33				

Event of September 28-29, 1960

	.00	.00		RG	B-36-R					
			9-28	2219	.00	.00	9-28	2219	.0000	.0000
				2225	1.60	.16		2228	.0191	.0000 T
				2229	3.15	.37		2230	.642	.01
				2235	5.10	.88		2233	1.74	.08
				2241	3.00	1.18		2236	3.35	.19
Watershed conditions: 100% fallow, seeded to wheat on 9/9/60, wheat now 2" high; good residue cover.										
				2331	.72	1.30		2239	2.33	.33
			9-29	0021	.14	1.42		2245	.669	.47
				0101	.11	1.49		2249	.370	.50
				0121	.18	1.55		2252	.223	.52
								2258	.105	.53
							9-29	2310	.0235	.54
								0008	.0018	.55
								0020	.0700	.55
								0035	.0700	.57
								0107	.0390	.59
								0245	.0000	.60

Event of August 23, 1962

	RG	B-36-R		RG	B-36-R					
7-26	.07	.00	8-23	1920	.00	.00	8-23	1923	.0000	.0000
7-27	.65	.01		1926	.70	.07		1933	T	T
7-29	.06	.00		1934	.00	.07		1943	T	T
8-2	.17	.00		1937	1.80	.16		1948	.01	.01
8-4	.51	.01		1942	3.60	.46		1953	.25	.04
8-10	.13	.00		1945	6.00	.76		1958	.33	.07
8-11	.03	.00		1953	4.65	1.38		2003	.35	.10
8-15	.05	.00		1958	2.28	1.57		2008	.40	.12
8-22	.06	.00		2002	3.00	1.77		2013	.20	.14
8-23	.58	.00		2010	.60	1.85		2018	.11	.14
Watershed conditions: 100% sorghum, about 5' high, heads well filled, cultivated on June 29; crop rotation or sorghum, fallow and winter wheat.										
				2015	.12	1.86		2023	.07	.15
								2028	.10	.16
								2033	.15	.18
								2043	.12	.20
								2053	.08	.21
								2103	.04	.21
								2113	.03	.22
								2123	.02	.22
								2133	.01	.22
								2153	T	.22
								2223	T	.23
								2243	.00	.23

SELECTED RUNOFF EVENTS

WATERSHED 8-H (44.12)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
<u>Event of July 27, 1964</u>										
	RG B-36-R			RG	B-36-R					
7-1	.45	.00	7-27	0228	.00	.00	7-27	0304	.0000	.0000
7-7	.29	.00		0243	.28	.07		0309	.009	T
7-8	.11	.00		0255	.55	.18		0319	.014	T
7-10	.50	T		0302	1.46	.35		0324	.019	T
7-11	.17	.00		0326	.83	.68		0329	.091	.01
7-26	1.37	.02		0332	3.50	1.03		0334	.538	.04
				0335	2.20	1.14		0339	.712	.09
				0345	.78	1.27		0344	.712	.15
								0354	.464	.24
								0404	.194	.30
								0424	.039	.34
								0454	.009	.35
								0524	.002	.35
Watershed conditions: In wheat. Combined on June 27. The 22 bu. per acre yield of wheat did not reflect the residue due to hail damage on June 21. Estimated residue of 6,000 lbs. per acre. Ground cover 90 to 100% residue and annual weed growth. Top soil very dry with cracks 1 to 3' deep.										

<u>Event of May 21-22, 1965</u>										
	RG B-36-R			RG	B-36-R					
4-24	.71	T	5-21	2141	.00	.00	5-21	2141	.0000	.0000
5-4	.57	.00		2146	1.32	.11		2155	.33	.02
5-7	.77	.02		2207	4.23	1.59		2200	.48	.05
5-8	.02	T		2215	1.35	1.77		2205	1.00	.11
5-14	.71	T		2229	.60	1.91		2215	1.42	.31
5-17	.20	.00		2239	2.58	2.34		2229	.90	.58
				2244	3.96	2.67		2235	.97	.68
				2254	2.52	3.09		2245	1.44	.88
				2304	.96	3.25		2255	1.81	1.11
				2314	.24	3.29		2305	1.36	1.41
				2319	.84	3.36		2325	.56	1.73
								2340	.22	1.83
								2400	.06	1.88
								0030	.01	1.89
								0115	.00	1.90

Watershed conditions: No spring tillage. Cover is weeds and wheat stubble.

<u>Event of June 12-13, 1965</u>										
	RG B-36-R			RG	B-36-R					
5-14	.71	T	6-12	2116	.00	.00	6-12	2116	.0000	.0000
5-17	.20	.00		2129	2.77	.60		2121	.01	T
5-21	3.36	1.88		2139	.24	.64		2125	.17	.01
5-22	4.08	2.47		2149	.84	.78		2137	.07	.04
5-24	1.14	.33		2159	.12	.80		2147	.19	.06
5-25	.15	.00		2334	.00	.80		2152	.22	.07
5-31	.07	.00		2347	.83	.98		2206	.13	.12
6-1	1.02	.04		2357	4.20	1.68		2236	.03	.16
6-2	.10	.06	6-13	0004	1.54	1.86		2331	.00	.17
6-5	.32	.00		0147	.04	1.93		2346	.03	.17
6-6	.12	.00						2356	.79	.24
6-9	.78	.02						0003	1.02	.35
6-10	.41	.03						0006	.98	.40
6-11	.09	.00						0026	.45	.64
								0056	.06	.76
								0221	.00	.81

Watershed conditions: No spring tillage. Cover is weeds and wheat stubble.

SELECTED RUNOFF EVENTS

WATERSHED 18-H (44.22)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
Event of June 15, 1957										
				RG	B-33-R					
5-15	.06	.00	6-15	1059	.00	.00	6-15	1119	.0000	.0000
5-29	.64	.02		1105	.50	.05		1121	.0446	T
5-31	.31	.00		1111	1.30	.18		1132	.0830	.01
6-6	.11	.00		1115	3.00	.38		1134	.128	.02
6-10	.74	.01		1145	1.30	1.03		1144	.237	.05
6-13	1.00	T		1155	4.08	1.71		1150	.305	.07
				1201	1.50	1.86		1154	.546	.10
Watershed conditions: Native				1231	.14	1.93		1158	1.42	.16
grass pasture 12" high, heading								1159	1.75	.19
and in excellent condition.								1202	2.02	.28
								1203	2.07	.32
								1205	2.02	.39
								1210	1.42	.53
								1220	.520	.69
								1225	.305	.72
								1230	.171	.74
								1240	.0700	.76
								1300	.0125	.78
								1340	.0000	.78
Event of June 12, 1958										
				RG	B-33-R					
5-14	.50	T	6-12	0152	.00	.00	6-12	0209	.0000	.0000
5-15	.12	.00		0156	.60	.04		0213	.178	T
5-16	.30	.00		0202	1.80	.22		0217	.684	.03
5-26	.30	.00		0207	3.00	.47		0219	1.07	.06
5-27	.16	.00		0209	4.50	.62		0221	1.25	.11
6-6	.11	.00		0214	3.96	.95		0225	1.31	.19
				0216	3.30	1.06		0226	1.29	.21
Watershed conditions: Native				0226	1.50	1.31		0230	1.03	.29
grass pasture 6" high, in good				0309	.11	1.39		0234	.697	.34
condition.				0312	1.80	1.48		0238	.427	.38
				0318	.40	1.52		0243	.237	.41
								0255	.0623	.43
								0303	.0300	.44
								0317	.0143	.45
								0428	.0000	.45
Event of May 18, 1959										
				RG	B-33-R					
4-19	.50	.00	5-18	0737	.00	.00	5-18	0805	.0000	.0000
5-2	.30	.00		0757	.18	.06		0807	.0300	T
5-3	.18	.00		0759	.00	.06		0811	.237	.01
5-4	.94	.05		0809	3.72	.68		0815	.385	.03
5-6	.91	.06		0811	1.50	.73		0817	.427	.04
5-9	1.06	.01		0823	.70	.87		0820	.395	.06
				0858	.05	.90		0824	.385	.09
Watershed conditions: Native				0903	.48	.94		0831	.253	.13
grass pasture 4" high, in good				0953	.06	.99		0837	.165	.15
condition.								0843	.107	.16
								0851	.0623	.17
								0900	.0300	.18
								0920	.0092	.19
								0950	.0000	.19
Event of May 15-16, 1960										
				RG	B-33-R					
4-16	.22	.00	5-15	2055	.00	.00	5-15	2154	.0000	.0000
4-25	.09	.00		2115	.45	.15		2204	.0785	.0036
4-27	.05	.00		2143	.11	.20		2208	.192	.01
4-28	.10	.00		2153	1.38	.43		2212	.406	.0308
4-29	.28	.00		2157	4.20	.71		2216	1.42	.09
5-3	.17	.00		2205	1.80	.95		2220	1.68	.20
5-5	1.63	.18		2211	5.40	1.49		2227	1.46	.38
5-6	.10	.00		2217	.40	1.53		2237	2.19	.67
				2233	2.62	2.23		2243	1.63	.769
Watershed conditions: 100%				2243	.18	2.26		2252	.806	1.04
pasture, 2" high, good con-								2257	.560	1.094
dition, fair to good cover.								2307	.297	1.16
								2322	.1136	1.211
								2335	.048	1.23
								5-16	0058	.0000
										1.24
Event of August 11, 1961										
				RG	B-33-R					
7-15	.29	T	8-11	0029	.00	.00	8-11	0033	.0000	.0000
7-18	.21	.00		0033	4.35	.29		0037	.067	.002
7-20	.20	.00		0039	4.90	.78		0040	.097	.01
7-22	.16	.00		0052	4.11	1.67		0043	.078	.01
7-26	.13	.00		0055	1.80	1.76		0046	.117	.0157
8-1	.19	.00		0113	.43	1.89		0052	.374	.0400
8-4	.08	.00		0147	.09	1.94		0055	.280	.0547
Watershed conditions: 100%								0059	.171	.07
pasture, 6" high, excellent								0105	.0826	.084
condition, 75% density.								0114	.025	.09
								0132	.0038	.0948
								0249	.0000	.0958

SELECTED RUNOFF EVENTS

WATERSHED 18-H (44.22)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
<u>Event of August 23, 1962</u>										
RG B-33-R			RG B-33-R							
7-26	.06	.00	8-23	1919	.00	.00	8-23	1930	.0000	.0000
7-27	.68	.05		1929	.18	.03		1945	T	T
7-29	.06	.00		1937	.53	.10		1950	.05	.01
8-2	.15	.00		1943	1.50	.25		1955	.16	.04
8-4	.59	T		1947	4.05	.52		2000	.37	.07
8-10	.11	.00		1953	3.40	.86		2005	.55	.13
8-11	.03	.00		1956	2.80	1.00		2010	.71	.18
8-15	.05	.00		2001	2.16	1.18		2015	.66	.23
8-22	.13	.00		2005	2.85	1.37		2020	.43	.26
8-23	.68	.00		2009	1.35	1.46		2025	.24	.28
Watershed conditions: 100% native grass pasture, 4" high, good condition.				2015	.50	1.51		2030	.14	.28
				2020	.24	1.53		2035	.07	.28
				2030	.06	1.54		2040	.04	.29
								2045	.03	.29
								2055	.01	.29
								2105	T	.29
								2125	T	.30
								2145	.00	.30

Event of September 10, 1963

RG B-39-R			RG B-39-R							
8-11	.46	.00	9-10	0104	.00	.02	9-10	0115	.0000	.0000
8-12	.05	.00		0117	.32	.07		0123	.008	T
8-17	.07	.00		0124	1.55	.25		0130	.006	T
8-18	.77	.00		0149	.22	.34		0135	.012	T
8-23	.20	.00		0207	.27	.42		0155	.001	.01
8-27	.04	.00		0210	1.40	.49		0210	.036	.01
9-1	1.80	.01		0223	.69	.64		0215	.078	.01
9-4	.49	T		0232	1.07	.80		0220	.088	.02
9-7	.10	.00		0236	.75	.85		0233	.245	.06
9-9	2.13	.14		0249	.14	.88		0250	.140	.11
Watershed conditions: 100% pasture. Good stand, grazed short.				0316	.07	.91		0310	.065	.14
				0426	.01	.95		0330	.018	.16
				0856	.01	.98		0350	.006	.16
				1200	.01	1.02		0415	.0000	.16

Event of July 27, 1964

RG B-39-R			RG B-39-R							
7-1	.65	.00	7-27	0222	.00	.00	7-27	0254	.0000	.0000
7-7	.31	.00		0247	.10	.04		0257	.005	T
7-8	.21	.00		0252	1.68	.18		0301	.006	T
7-10	.55	.00		0304	.90	.36		0312	.025	T
7-11	.18	.00		0326	.52	.55		0327	.023	.01
7-26	1.32	.13		0336	3.24	1.09		0330	.074	.01
Watershed conditions: In permanent pasture. Heavy grazing begun in early April. Grass very short by July; turning brown with no green growth prior to event. Ragweed and annuals on the increase; ground cover estimated at 50% to 60%.				0342	1.00	1.19		0334	.427	.03
				0352	.36	1.25		0337	.655	.06
				0432	.14	1.34		0341	.822	.10
								0342	.822	.12
								0345	.758	.16
								0351	.546	.22
								0357	.324	.27
								0405	.146	.30
								0415	.051	.32
								0430	.012	.32
								0510	.0000	.33

Event of June 12-13, 1965

RG B-39-R			RG B-39-R							
5-14	.73	.00	6-12	2340	.00	.00	6-12	2340	.0000	.0000
5-17	.09	.00		2350	.60	.10		2350	.01	T
5-21	3.28	.00		2400	3.54	.69		2400	.87	.07
5-22	4.19	.00	6-13	0010	1.14	.88	6-13	0006	1.23	.18
5-24	1.09	.00		0200	.08	1.02		0010	1.12	.26
5-25	.16	.00						0030	.37	.51
5-31	.08	.00						0100	.07	.62
6-1	.98	.22						0140	.01	.64
6-2	.11	.12						0240	.00	.65
6-5	.36	.01								
6-7	.13	.00								
6-9	.64	.03								
6-10	.42	.02								
6-11	.08	.00								
6-12	.51	.29								
Watershed conditions: In permanent pasture. Heavy grazing began in April. Grass 3" to 6" high. Ground cover 75%.										

SELECTED RUNOFF EVENTS

WATERSHED 23-H (44.27)

ANTECEDENT CONDITION			RAINFALL				RUNOFF			
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)
<u>Event of August 23, 1962</u>										
RG C-40			RG	C-45-R						
7-26	.08	.00	8-23	1925	.00	.00	8-23	1944	.00	.00
7-27	.72	.05		1939	.64	.15		1946	.56	.01
7-29	.05	.00		1951	4.40	1.03		1949	1.15	.05
8-2	.19	.00		1955	7.50	1.53		1951	1.67	.11
8-4	.35	.01		1958	4.40	1.75		1954	2.36	.19
8-10	.07	.00		2005	2.74	2.07		1956	2.86	.30
8-11	.12	.00		2010	2.04	2.24		1959	3.24	.43
8-15	.04	.00		2020	.24	2.28		2001	2.93	.56
8-23	.58	.00						2004	2.58	.67
Watershed conditions: 100% meadow; converted from cultivated land to meadow by re-seeding in 1961. Grass clipped to 4" height on 8-10; good ground cover.			RG	C-40	2.52			2006	2.21	.78
								2009	1.81	.86
								2011	1.34	.92
								2014	1.03	.98
								2016	.80	1.02
								2019	.58	1.05
								2024	.27	1.08
								2029	.16	1.10
								2034	.09	1.11
								2039	.04	1.12
								2049	.01	1.12
								2059	T	1.12
								2109	.00	1.12

Event of September 10, 1963

RG C-40-R			RG	B-31-R						
8-11	.54	.00	9-10	0040	.00	.00	9-10	0216	.000	.00
8-17	.12	.00		0100	.12	.04		0217	.029	T
8-18	.72	.00		0103	.80	.08		0218	.156	T
8-23	.32	.00		0111	.23	.11		0220	.224	.01
8-27	.05	.00		0119	.75	.21		0227	.354	.04
9-1	1.80	.00		0131	.30	.27		0239	.203	.10
9-4	.40	.00		0150	.16	.32		0255	.088	.14
9-9	2.03	.05		0203	.28	.38		0310	.037	.15
Watershed conditions: 100% meadow, no operations. Average grass height of two feet on September 1.				0207	1.50	.48		0330	.007	.16
				0218	1.53	.76		0400	.000	.16
				0226	1.13	.91				
				0248	.22	.99				
				0340	.05	1.03				
			RG	C-40-R	1.11					

Event of June 12 and 13, 1965

RG C-30-R			RG	C-40-R						
5-13	.04	.00	6-12	2336	.00	.00	6-12	2348	.00	.00
5-14	.82	.00		2349	1.29	.28		2352	.15	.01
5-17	.15	.00		2400	2.51	.74		2359	.75	.06
5-21	3.04	.88		0730	.02	.90	6-13	0010	.40	.16
5-22	4.46	1.56						0030	.12	.25
5-24	1.31	.07						0100	.01	.28
5-25	.15	.00						0130	.00	.29
5-31	.10	.00								
6-1	1.20	.00								
6-2	.07	T								
6-5	.26	.00								
6-6	.15	.00								
6-7	.08	.00								
6-9	.80	.00								
6-10	.42	.00								
6-11	.11	.00								
6-12	1.04	.06								

Watershed conditions: Grass meadow. Grass 8" to 20" high in good condition; ground cover estimated at 85%.

SELECTED RUNOFF EVENTS

WATERSHED 25-H (44.29)

ANTECEDENT CONDITION			RAINFALL				RUNOFF					
Date	P (in.)	Q (in.)	Date	Time	Rate (in/hr)	Acc. (in.)	Date	Time	Rate (in/hr)	Acc. (in.)		
<u>Event of May 21, 1965</u>												
	RG B-36-R			RG	B-36-R							
4-24	.71	.00	5-21	2141	.00	.00	5-21	2151	.00	.00		
5-4	.57	.00		2146	1.32	.11		2202	.27	.03		
5-7	.77	.00		2207	4.23	1.59		2205	.45	.05		
5-8	.02	.00		2215	1.35	1.77		2209	.36	.07		
5-14	.71	.00		2229	.60	1.91		2215	.31	.11		
5-17	.20	.00		2239	2.58	2.34		2228	.12	.15		
				2244	3.96	2.67		2238	.66	.22		
Watershed conditions: Grass mea- dow. Grass 5" to 15" high in good condition; ground cover estimated at 80%.							2254	2.52	3.09	1.09	.31	
							2304	.96	3.25	2253	1.43	.49
							2314	.24	3.29	2257	1.34	.59
							2319	.84	3.36			
							2305	.65	.72			
							2315	.25	.80			
							2325	.09	.83			
							2340	.02	.84			
							2400	.00	.84			

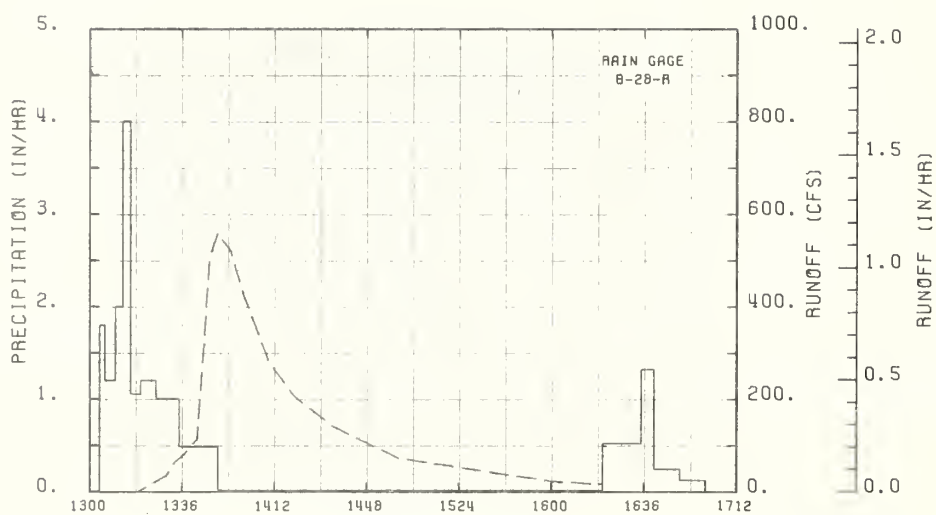
Watershed conditions: Grass meadow. Grass 5" to 15" high in good condition; ground cover estimated at 80%.

Event of June 12-13, 1965

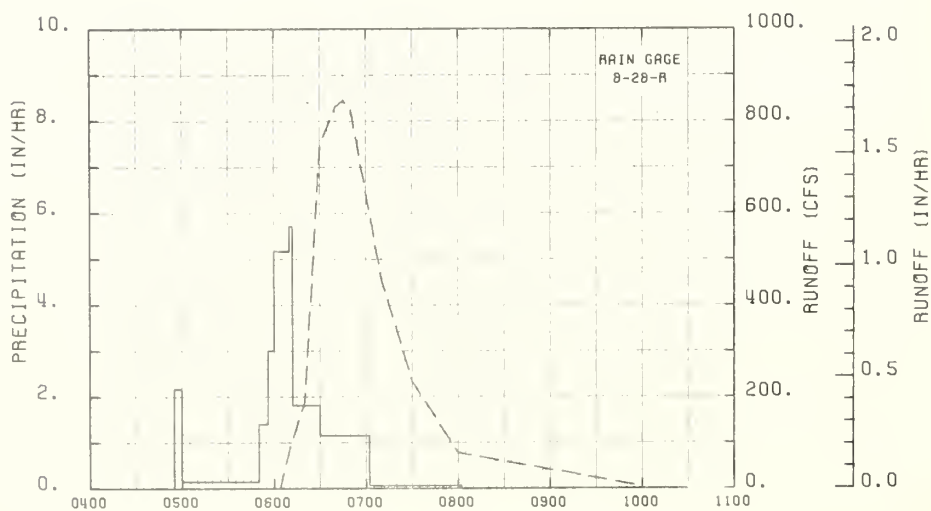
	RG B-36-R			RG	B-36-R					
5-14	.71	.00	6-12	2116	.00	.00	6-12	2120	.00	.00
5-17	.20	.00		2129	2.77	.60		2125	.06	.00
5-21	3.36	.84		2139	.24	.64		2140	.03	.01
5-22	4.08	1.63		2149	.84	.78		2148	.04	.02
5-24	1.14	.17		2159	.12	.80		2215	.01	.03
5-25	.15	.00		2334	.00	.80		2315	.00	.04
5-31	.07	.00		2347	.83	.98		2343	.00	.04
6-1	1.02	.01		2357	4.20	1.68		2353	.61	.09
6-2	.10	.00	6-13	0004	1.54	1.86		2400	1.12	.19
6-5	.32	.00		0147	.04	1.93	6-13	0010	.61	.33
6-6	.12	.00						0030	.14	.46
6-9	.78	.00						0100	.03	.50
6-10	.41	.00						0155	.01	.51
6-11	.09	.00						0300	.00	.51

Watershed conditions: Grass meadow. Grass 8" to 20" high in good condition; ground cover estimated at 85%.

WATERSHED W-3



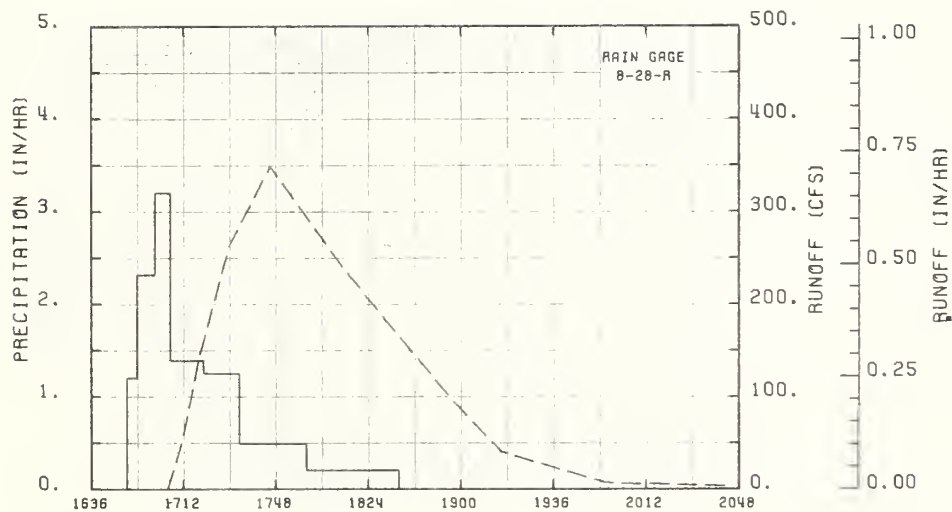
JUNE 20 1939



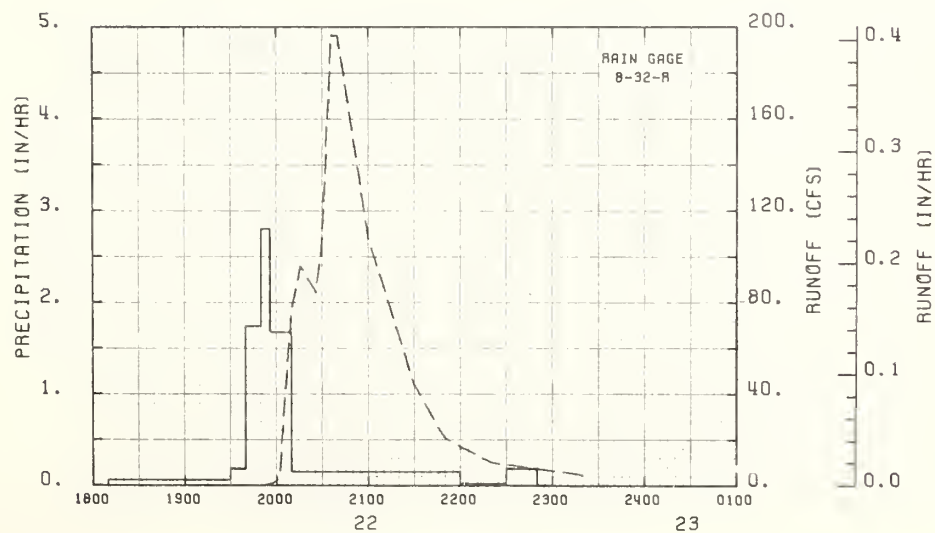
JULY 10 1951

A97

WATERSHED W-3



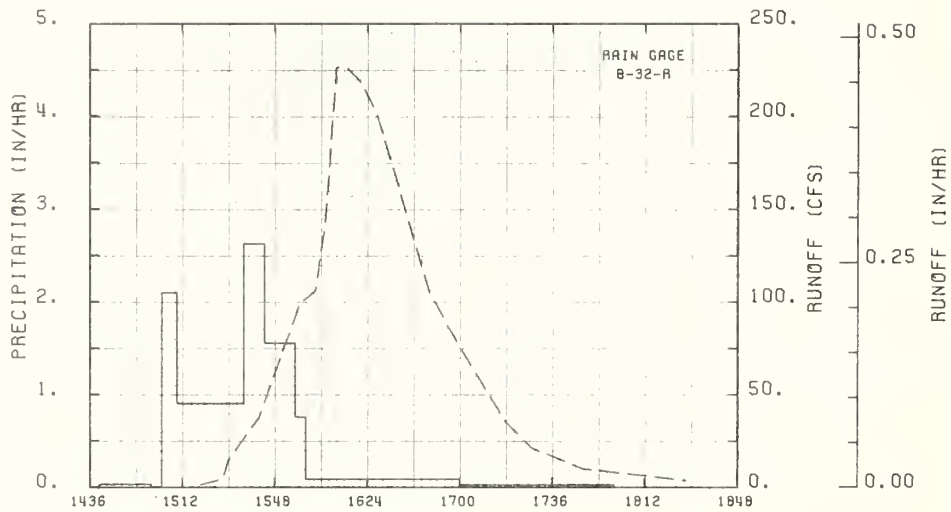
JUNE 7 1953



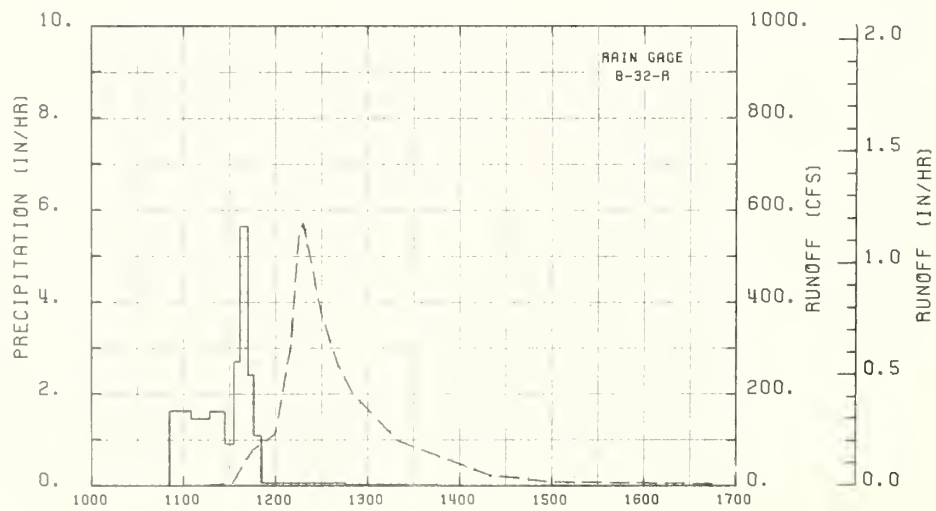
APRIL 22-23 1957

A98

WATERSHED W-3

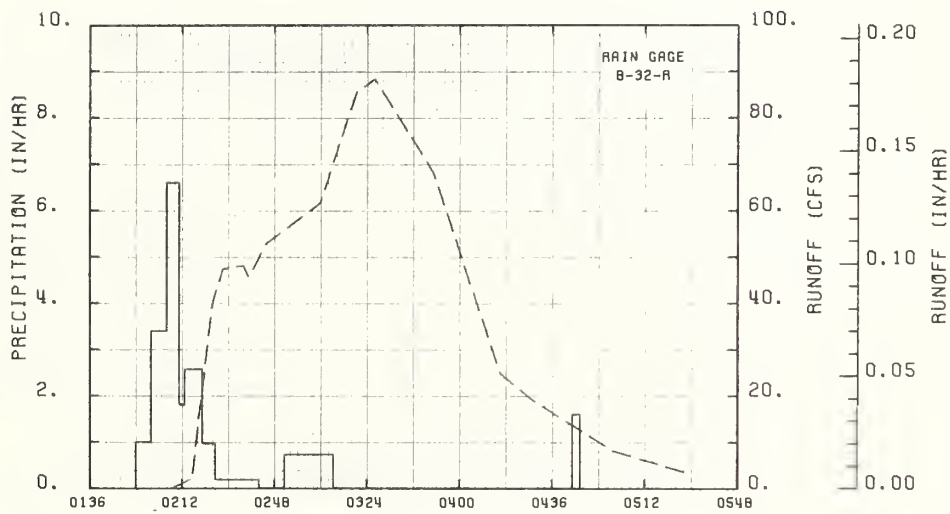


MAY 1 1957

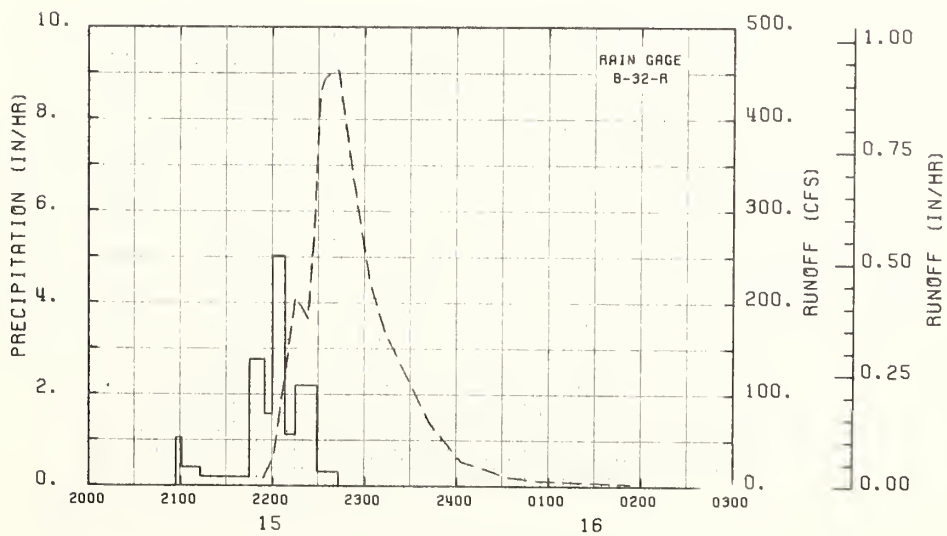


JUNE 15 1957

WATERSHED W-3



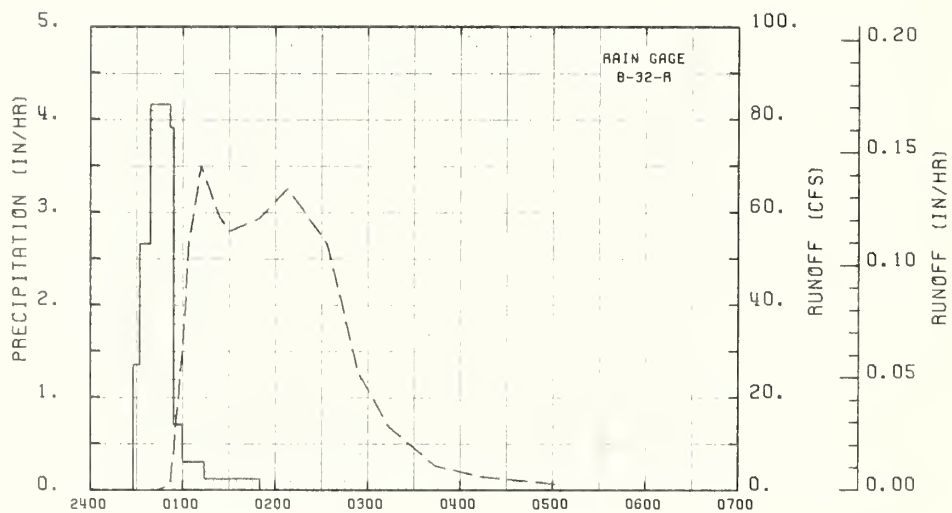
JUNE 12 1958



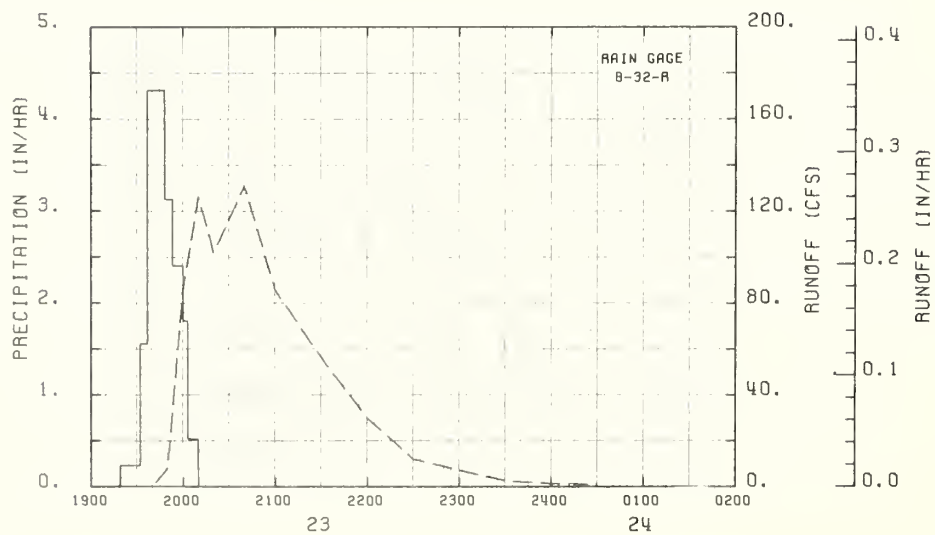
MAY 15-16 1960

A100

WATERSHED W-3



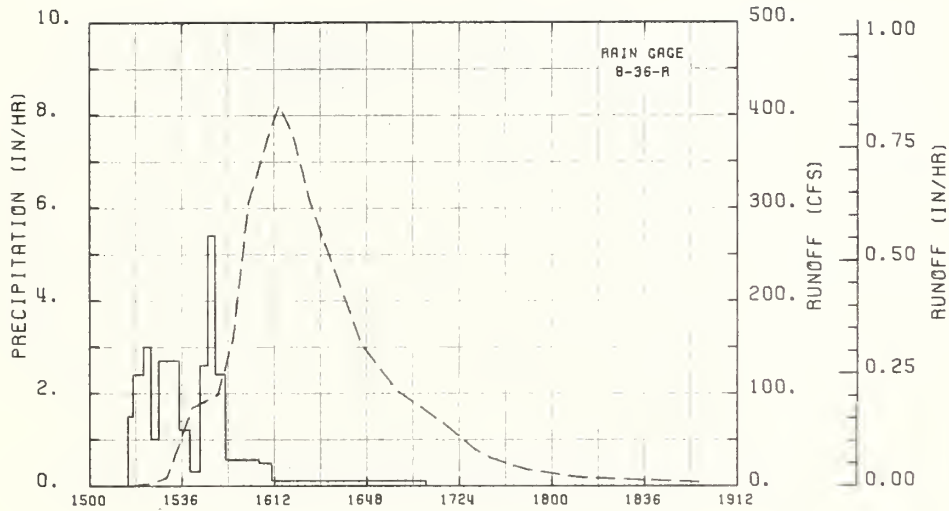
AUGUST 11 1961



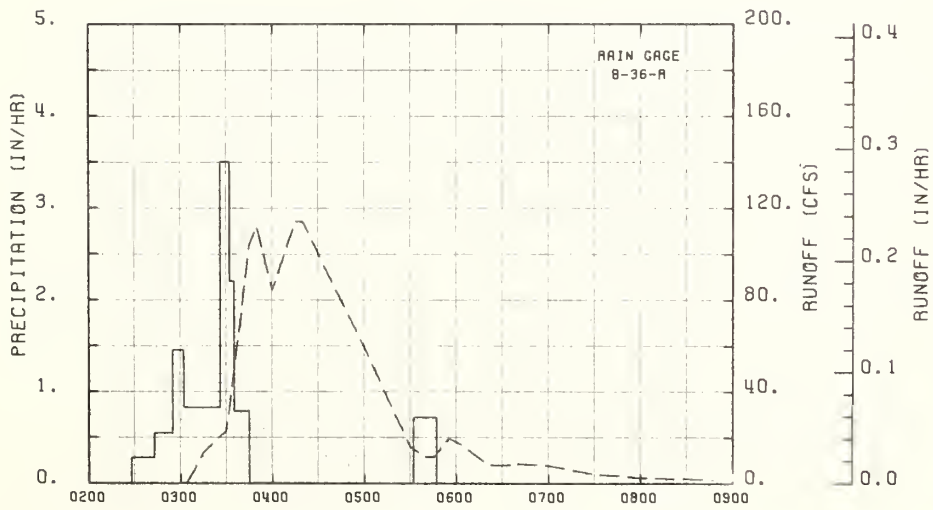
AUGUST 23-24 1962

A101

WATERSHED W-3

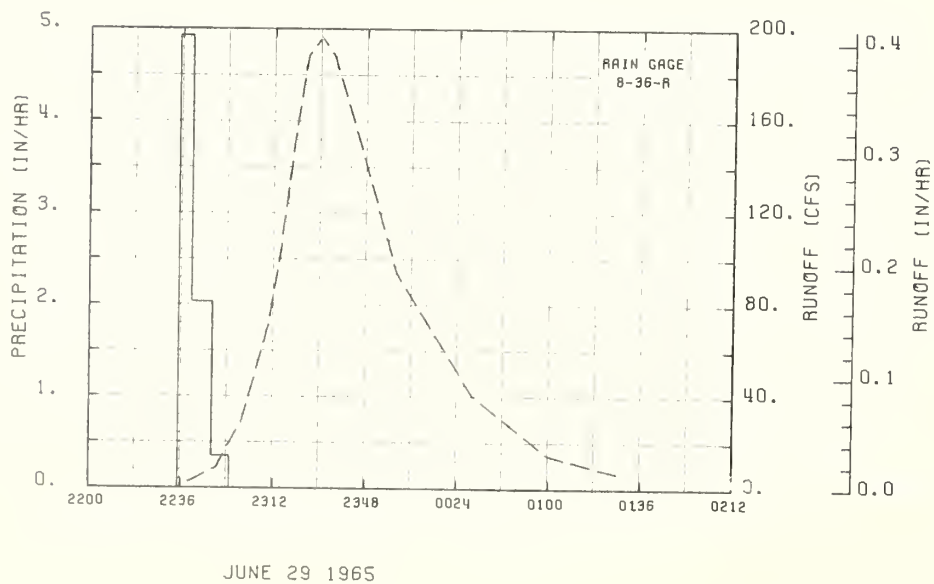
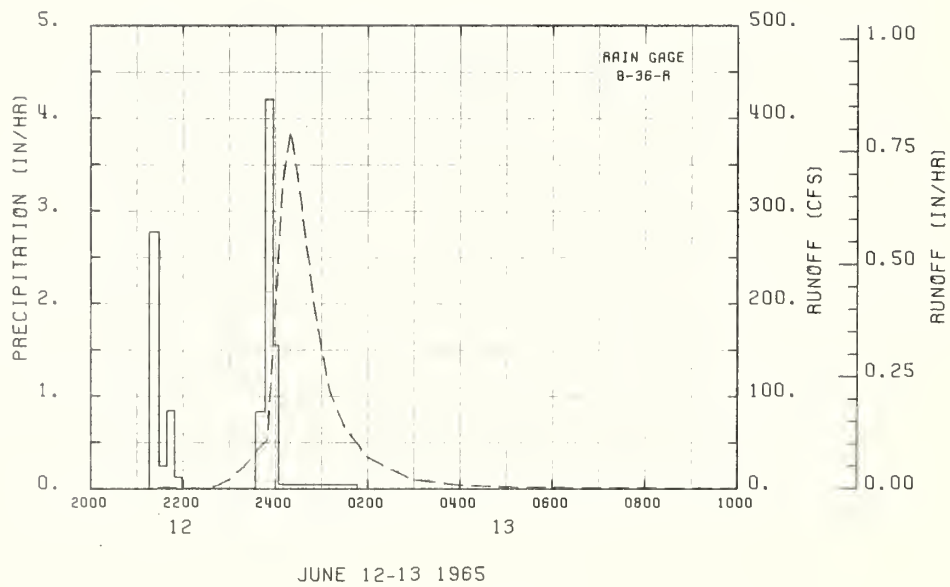


SEPTEMBER 9 1963



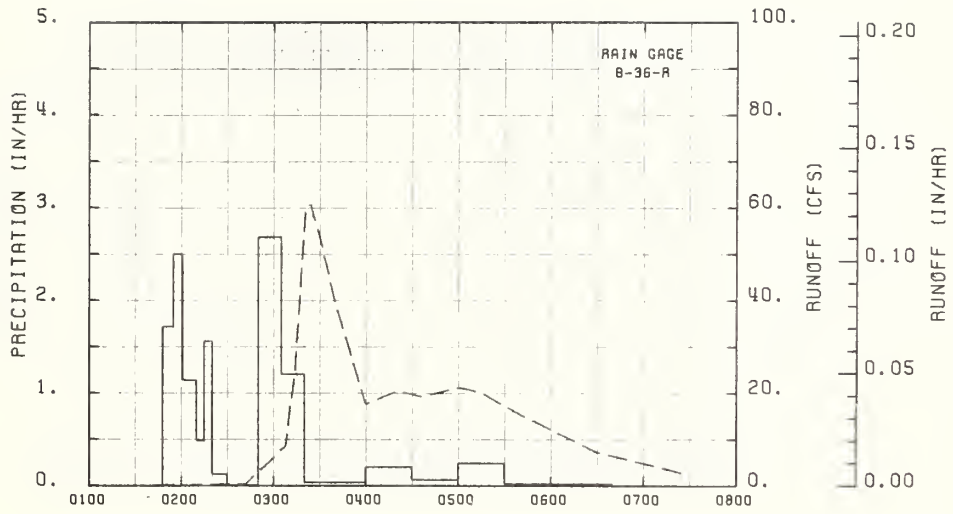
JULY 27 1964

WATERSHED W-3



A103

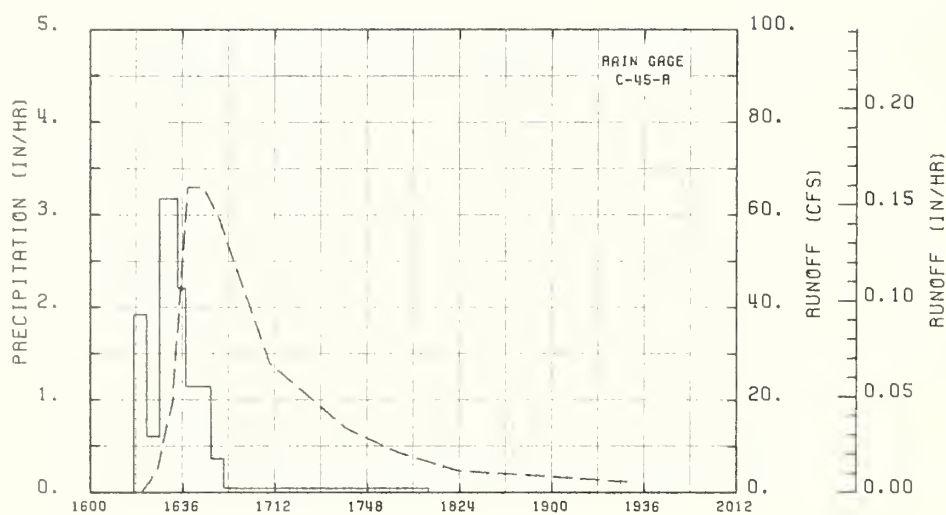
WATERSHED W-3



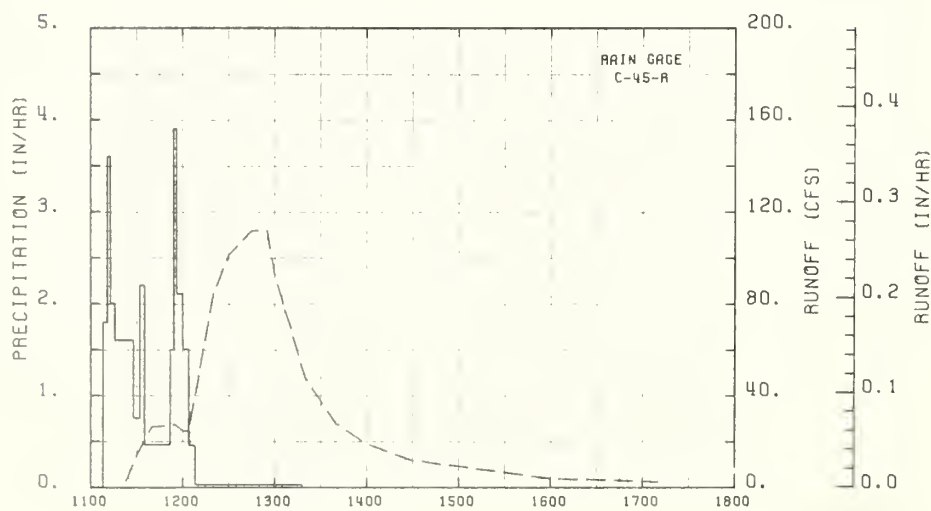
JULY 8 1967

A104

WATERSHED W-5



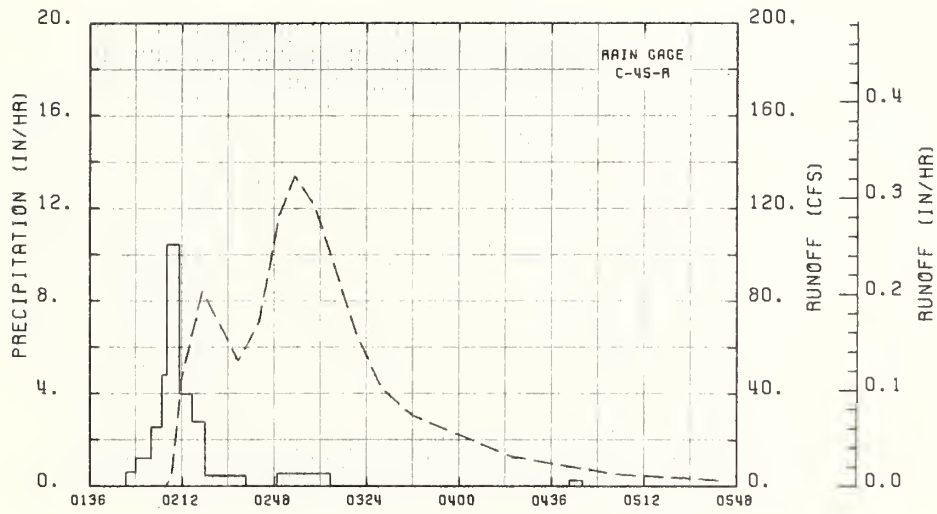
MAY 29 1957



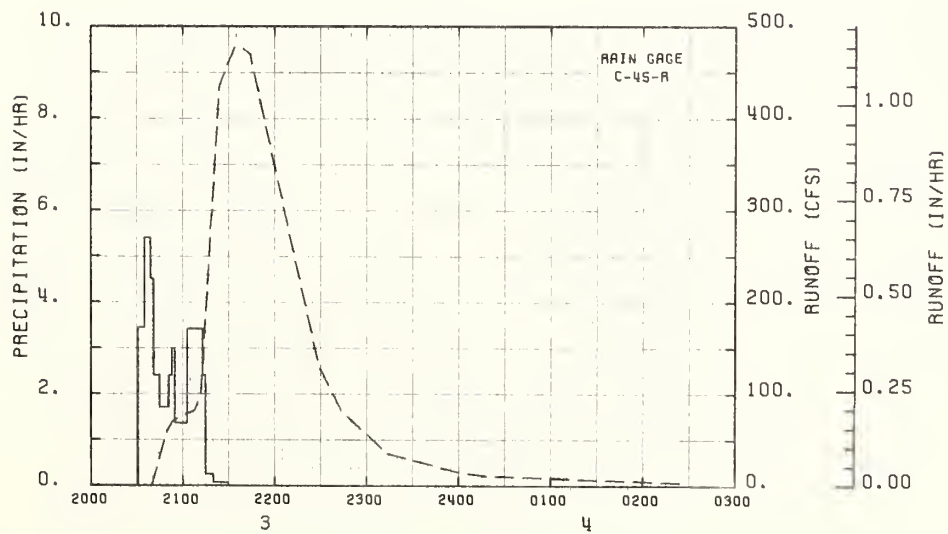
JUNE 15 1957

A105

WATERSHED W-5



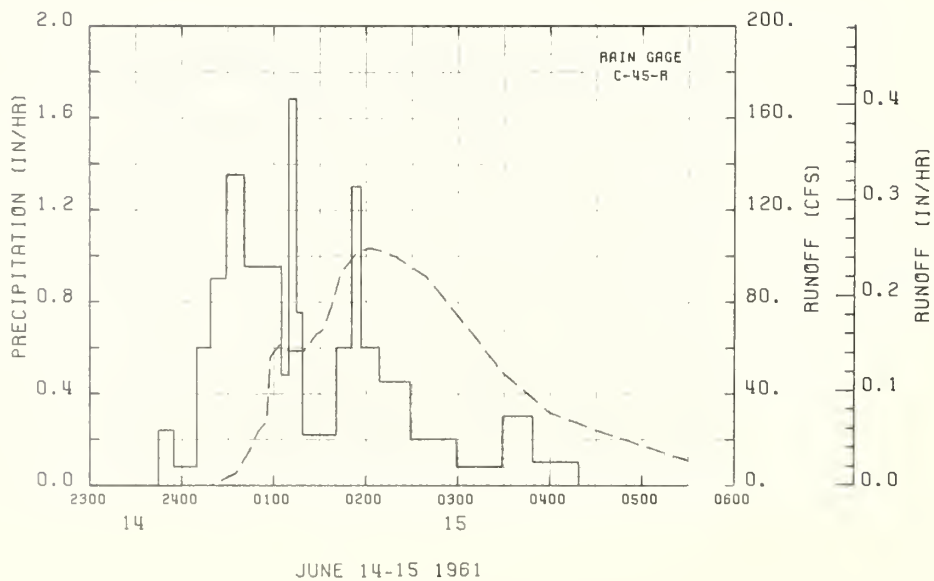
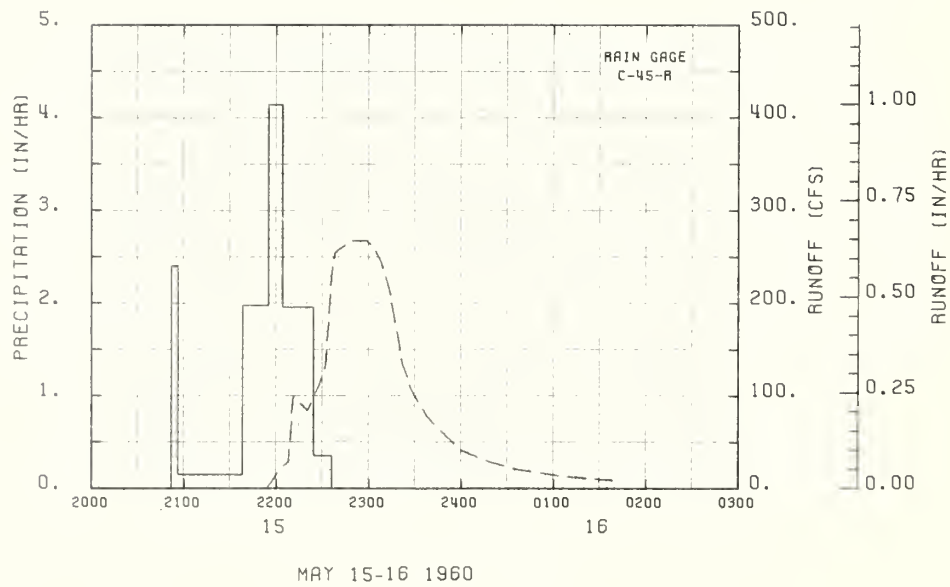
JUNE 12 1959



JULY 3 -4 1959

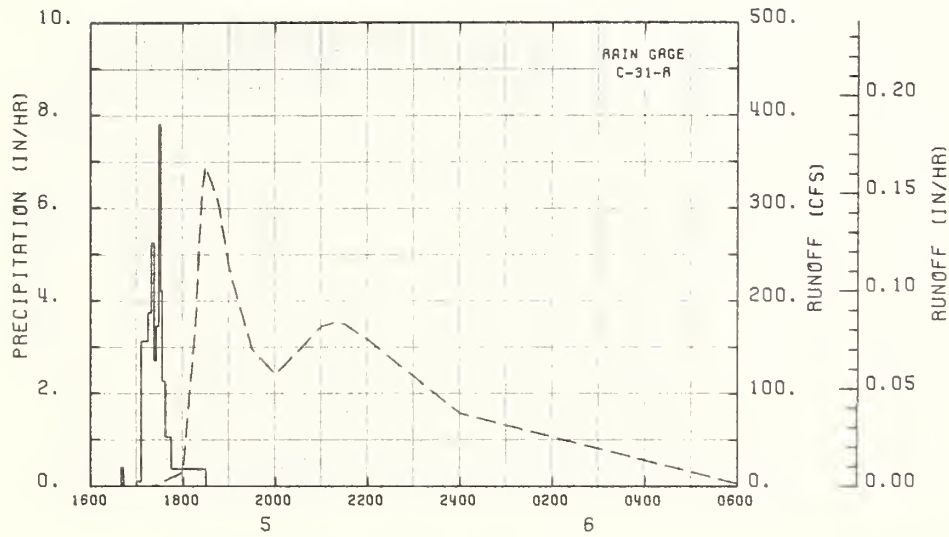
A106

WATERSHED W-5

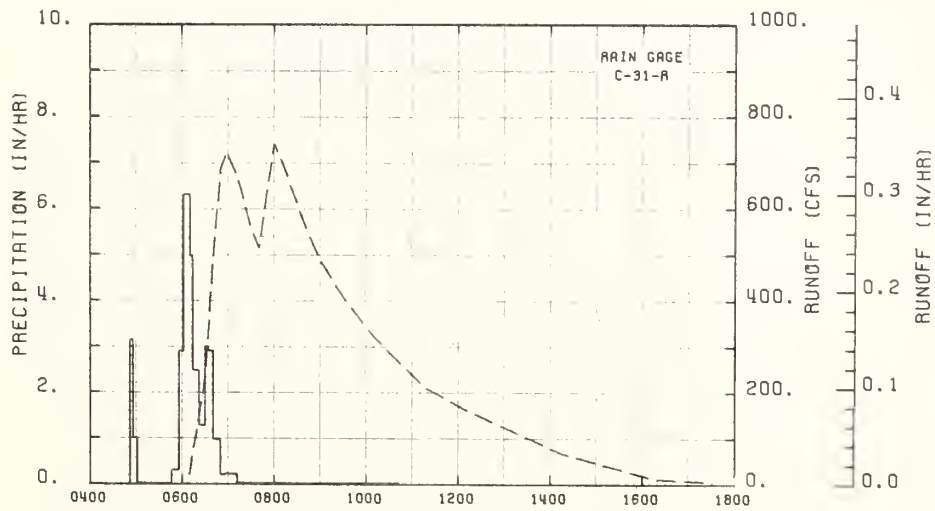


A107

WATERSHED W - 8



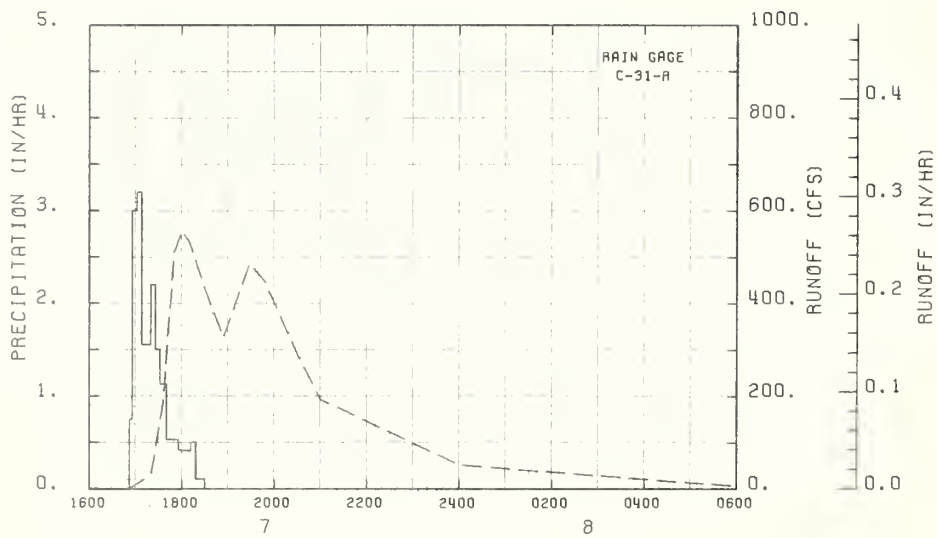
JUNE 5 -6 1942



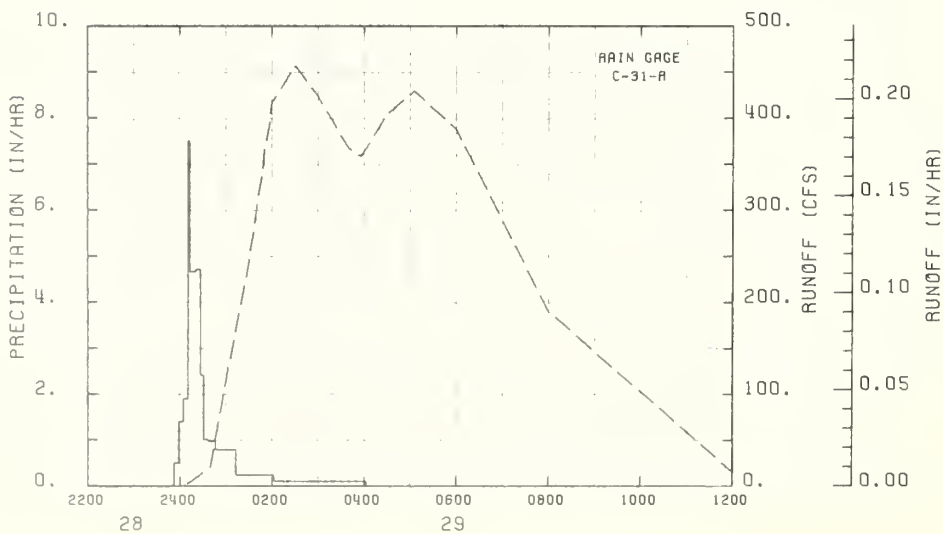
JULY 10 1951

A108

WATERSHED W-3



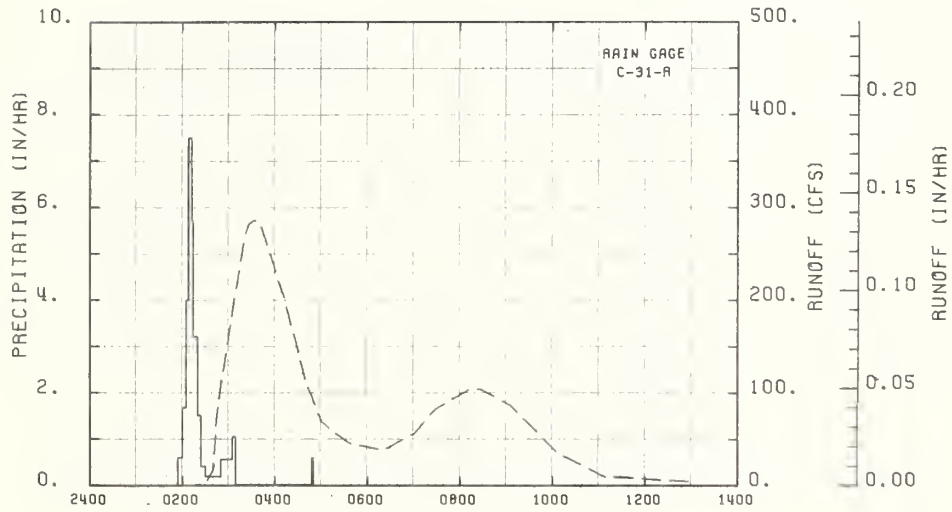
JUNE 7 -8 1953



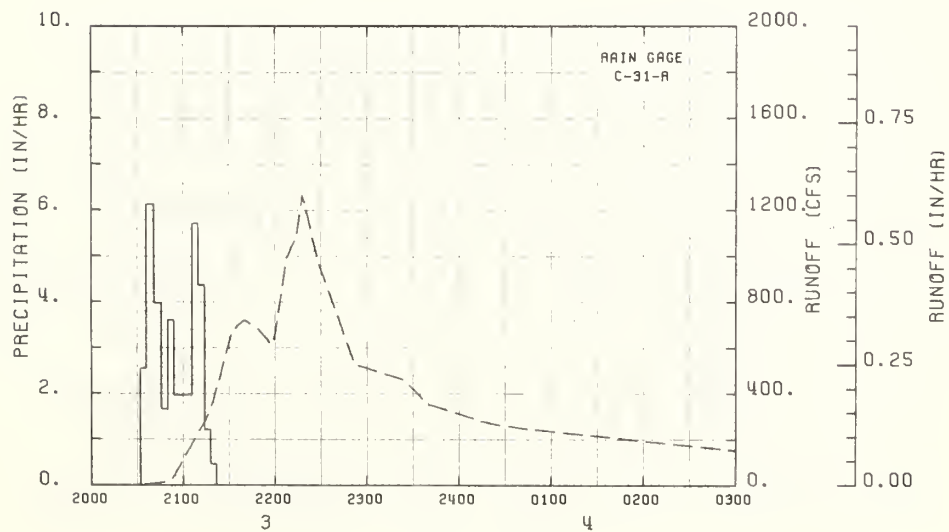
AUGUST 28-29 1957

A109

WATERSHED W - 8



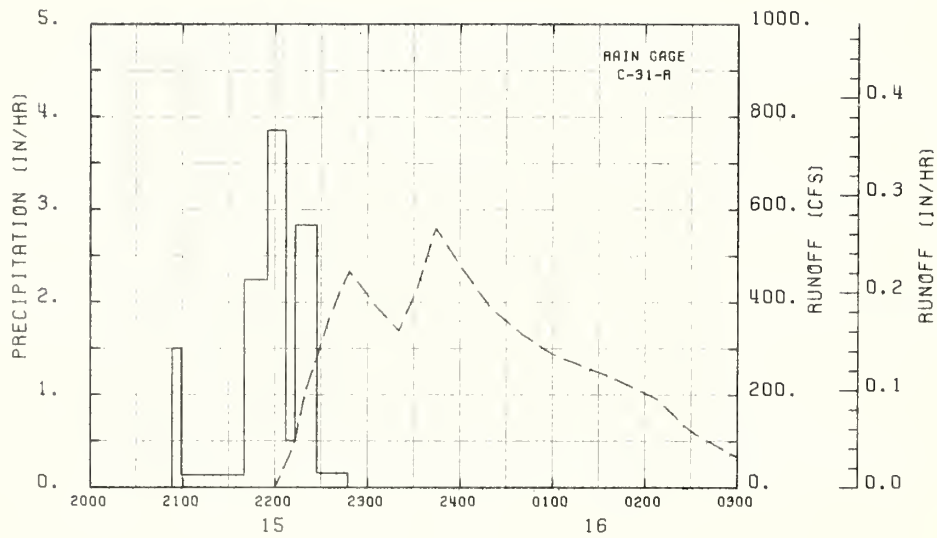
JUNE 12 1958



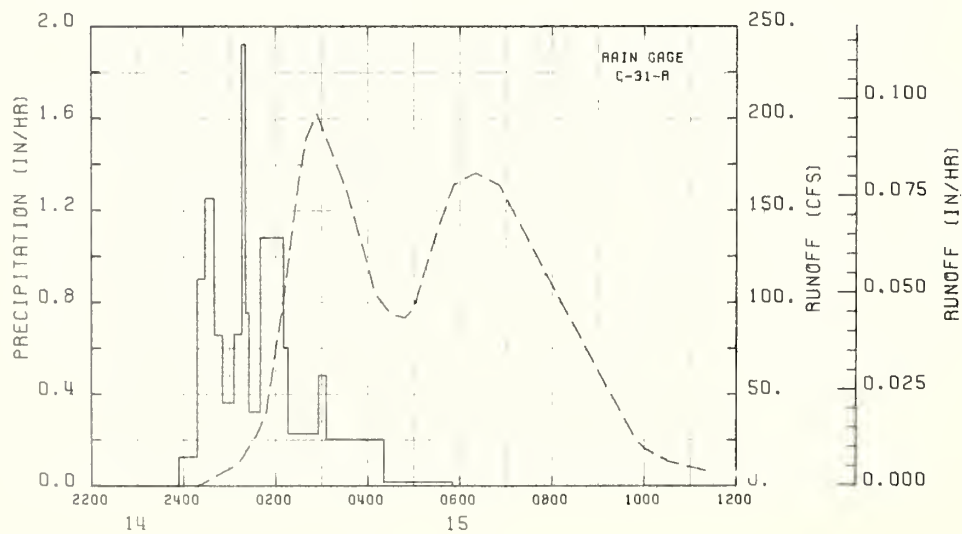
JULY 3 -4 1959

1110

WATERSHED W-8



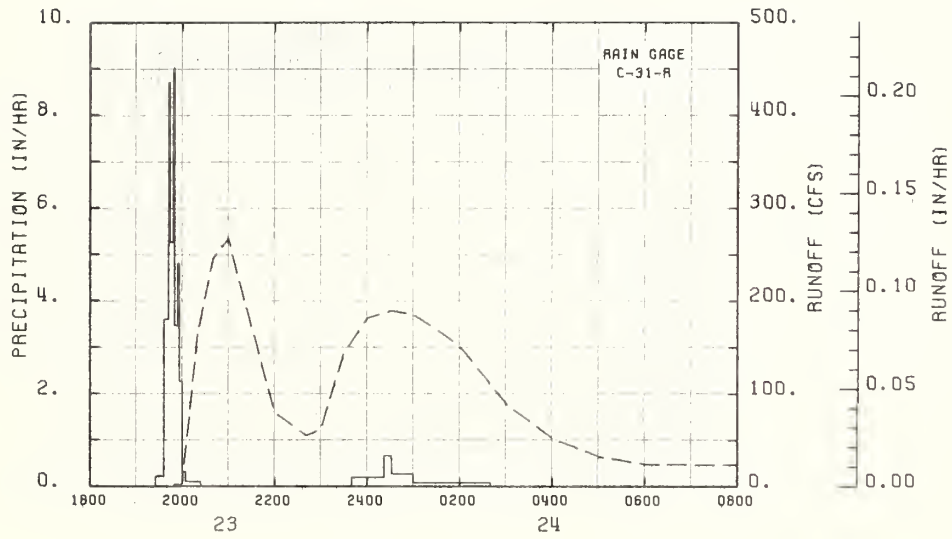
MAY 15-16 1960



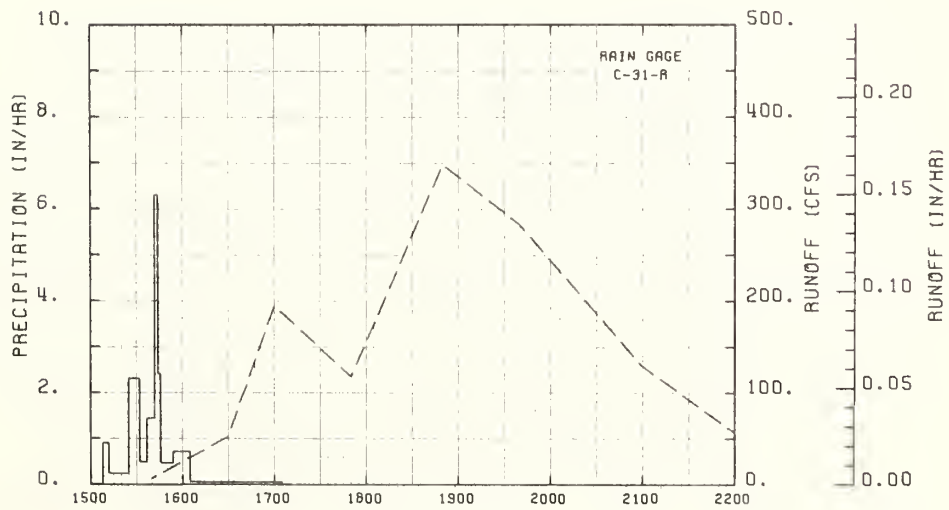
JUNE 14-15 1961

A111

WATERSHED W-8



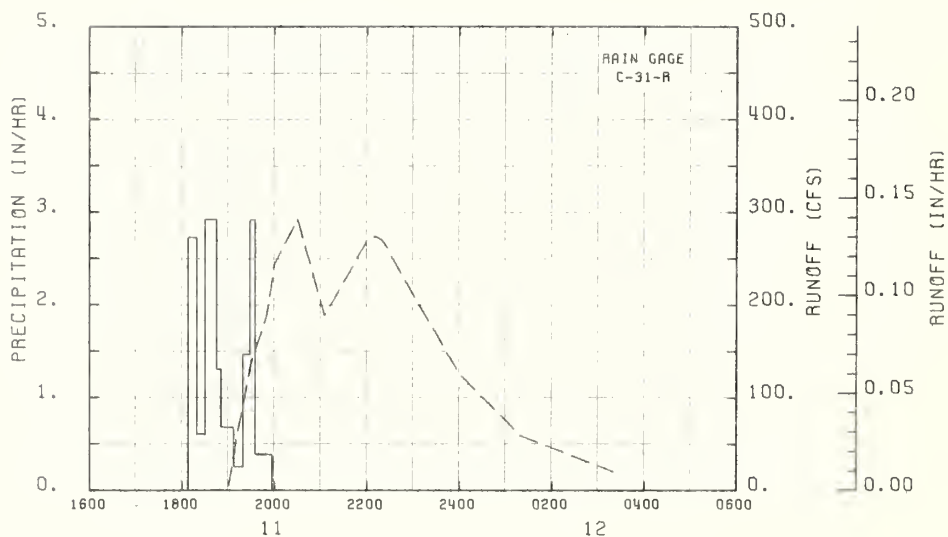
AUGUST 23-24 1962



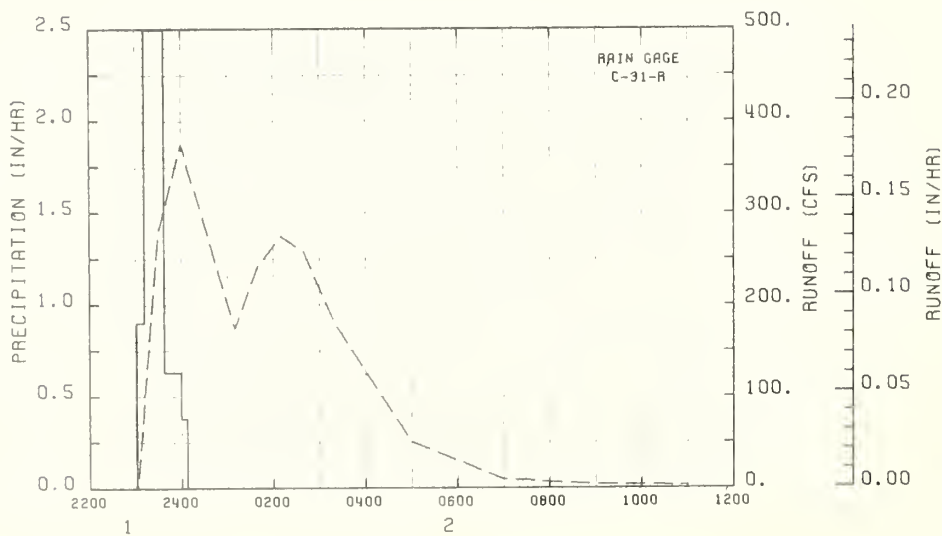
SEPTEMBER 9 1963

A112

WATERSHED W-3



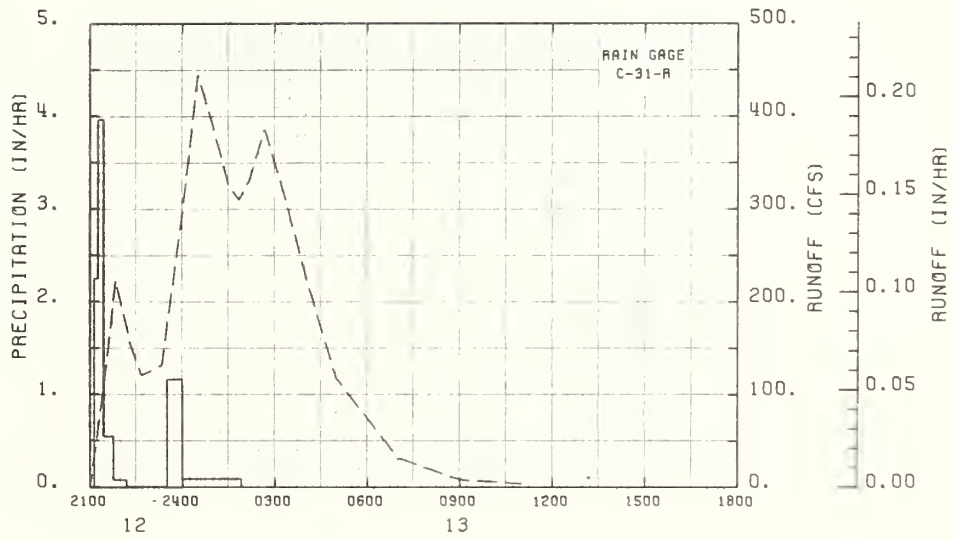
JUNE 11-12 1964



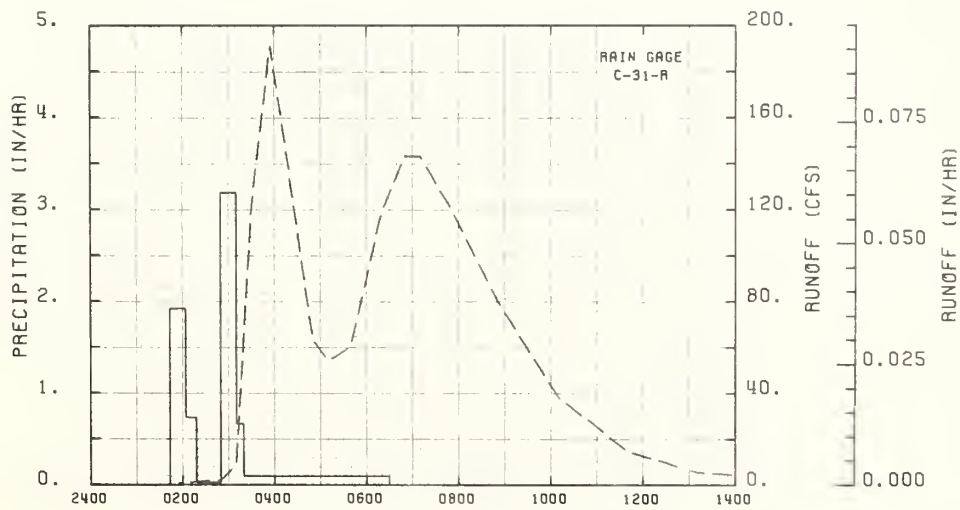
JUNE 1 -2 1965

A113

WATERSHED W-8



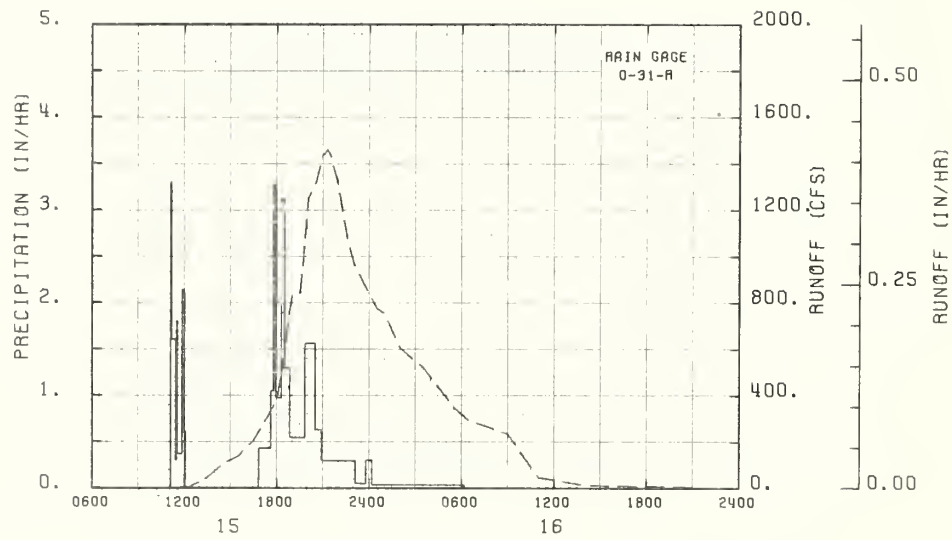
JUNE 12-13 1965



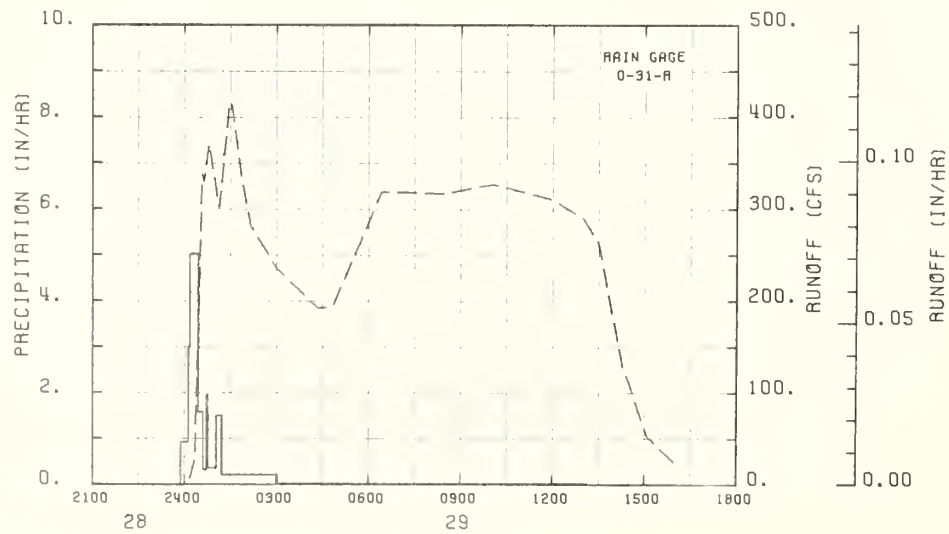
JULY 8 1967

A114

WATERSHED W-11



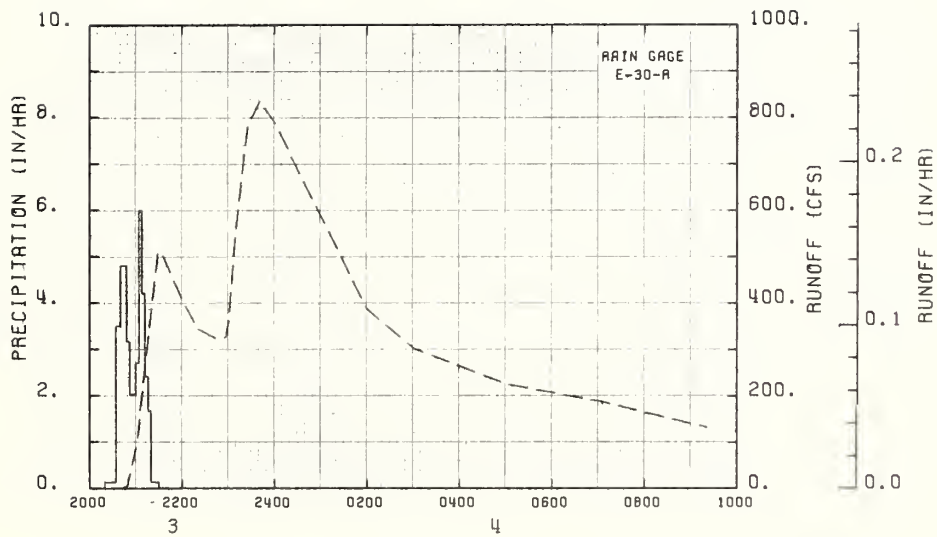
JUNE 15-16 1957



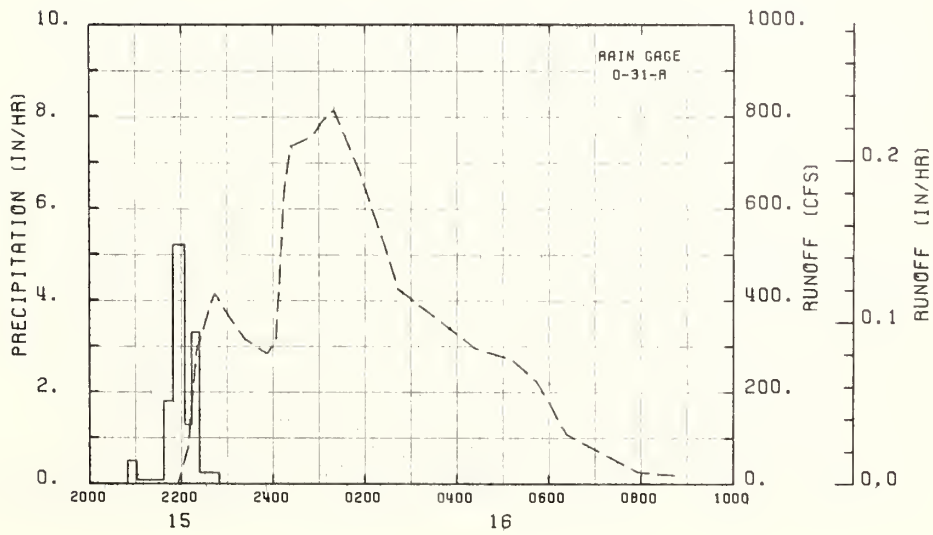
AUGUST 28-29 1957

A115

WATERSHED W - 11



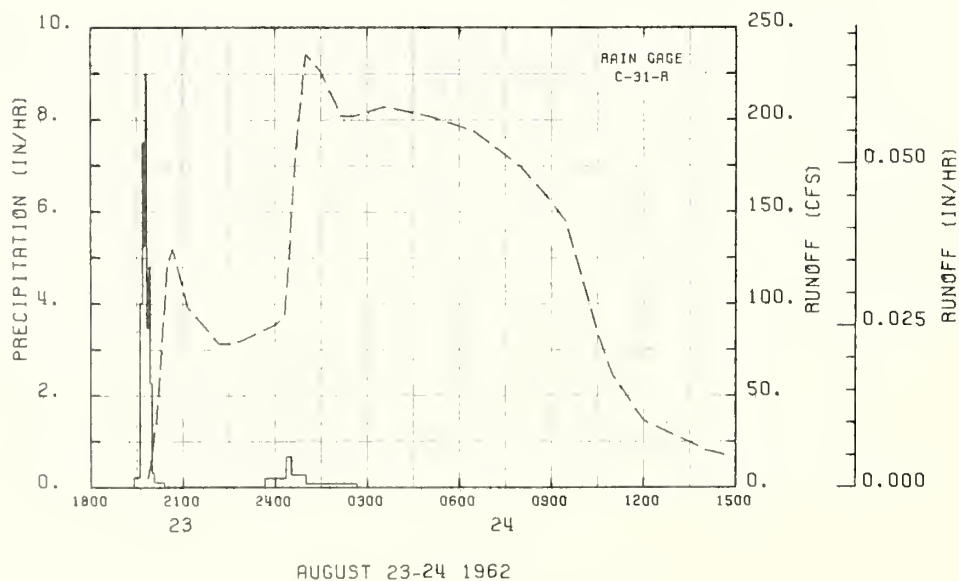
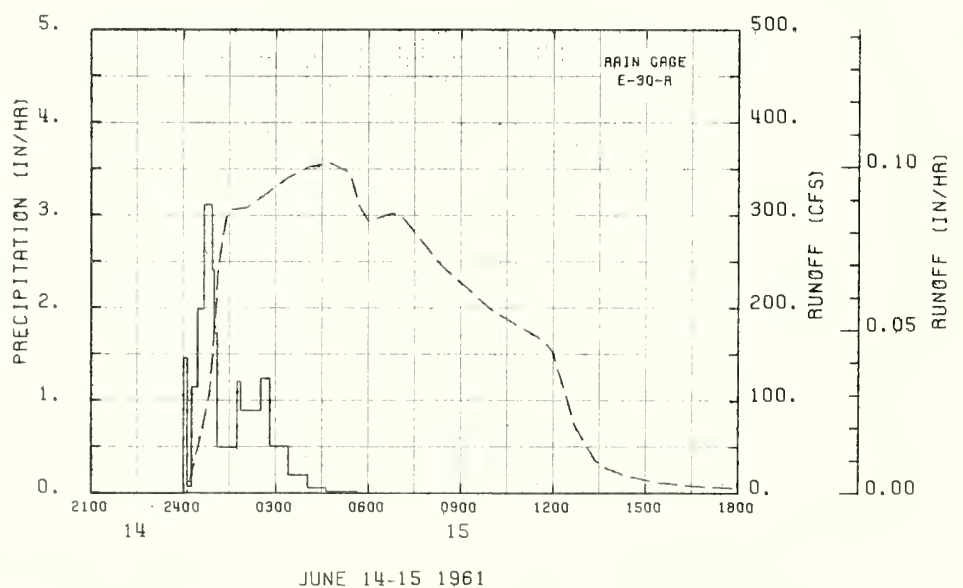
JULY 3 -4 1959



MAY 15-16 1960

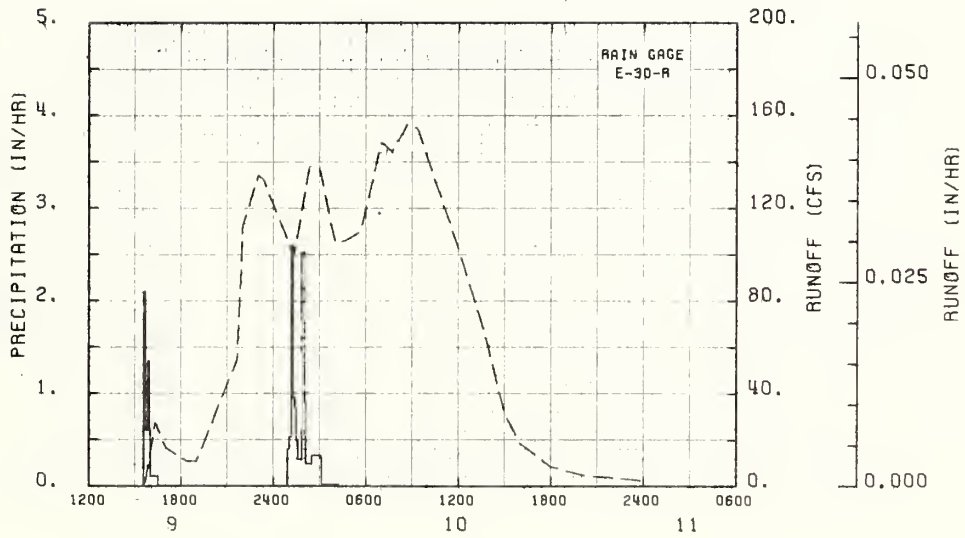
A116

WATERSHED W-11

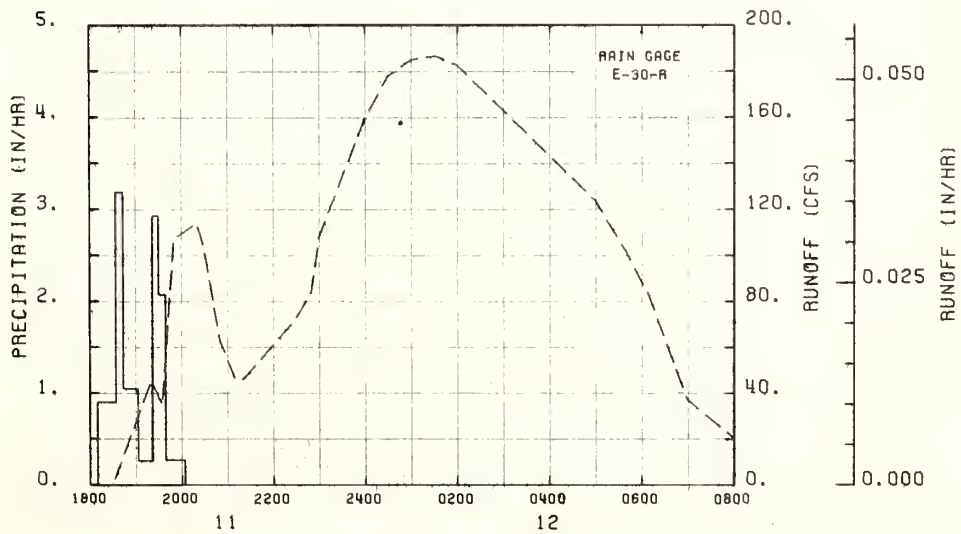


A117

WATERSHED W - 11



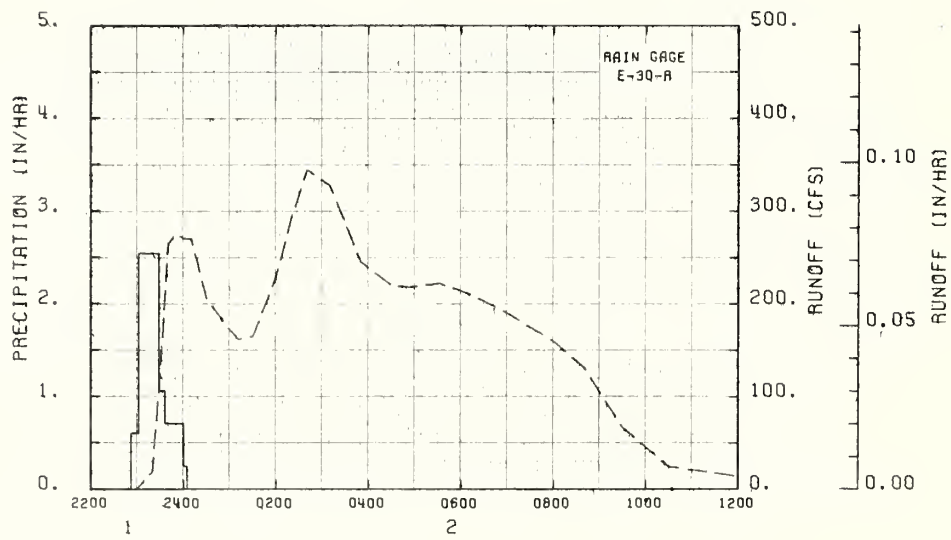
SEPTEMBER 9 -11 1963



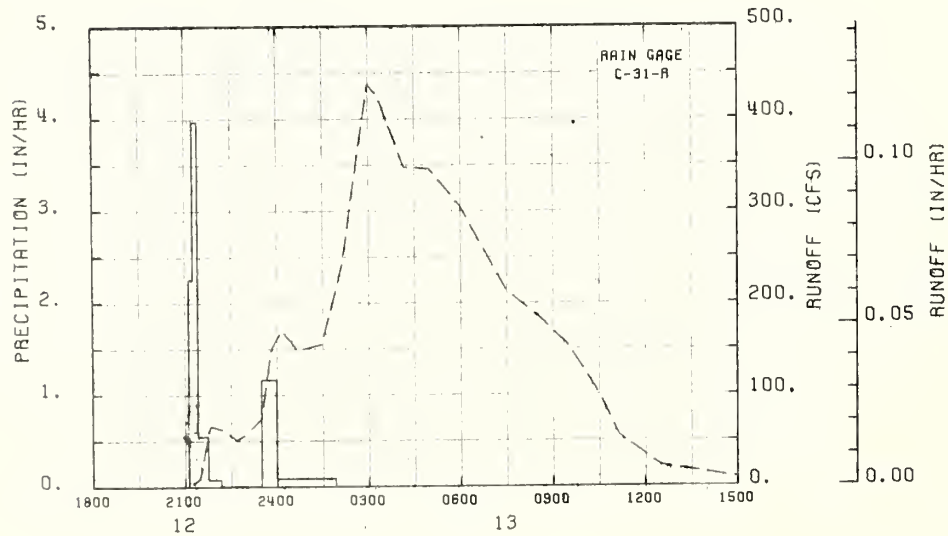
JUNE 11-12 1964

A118

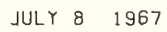
WATERSHED W - 11



JUNE 1 -2 1965

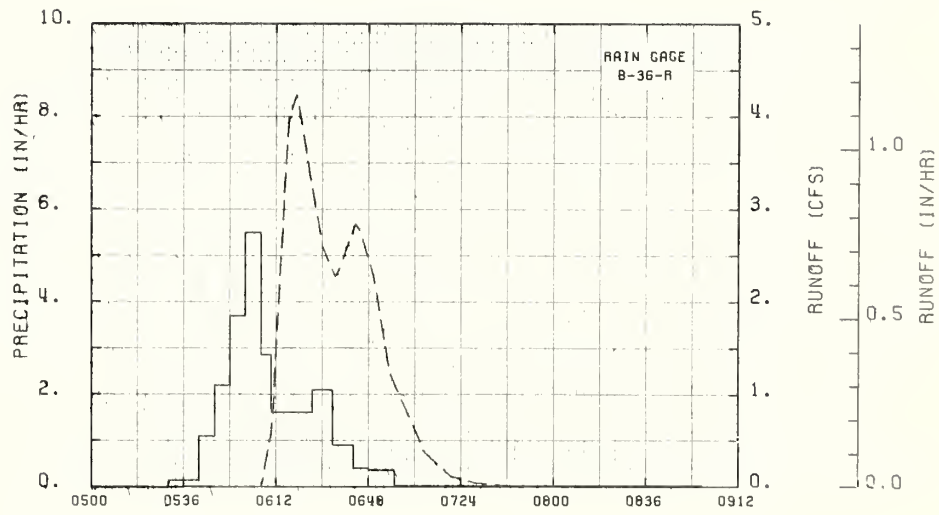


JUNE 12-13 1965

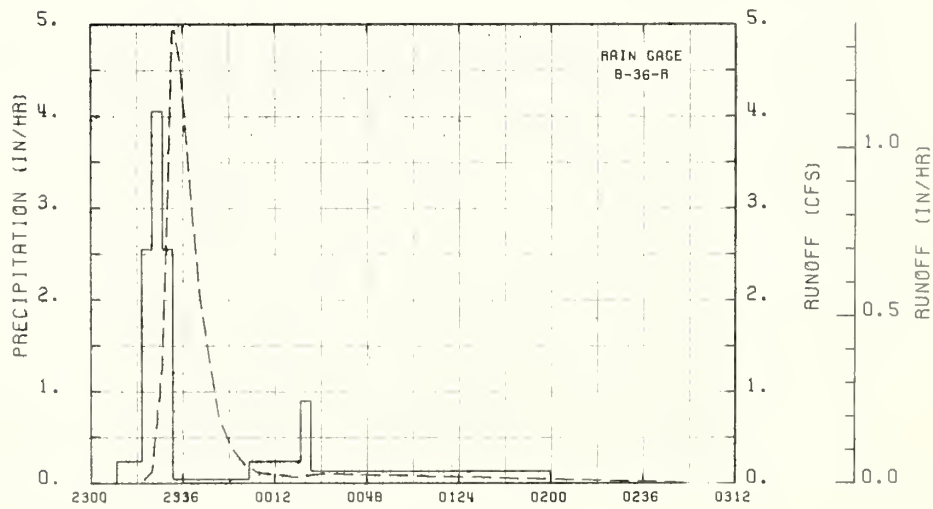


A120

WATERSHED 1H



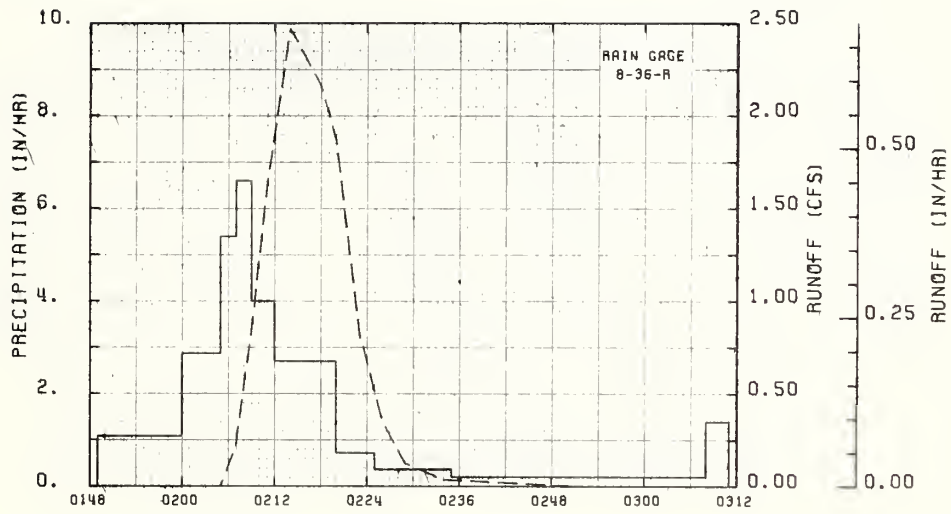
JULY 10 1951



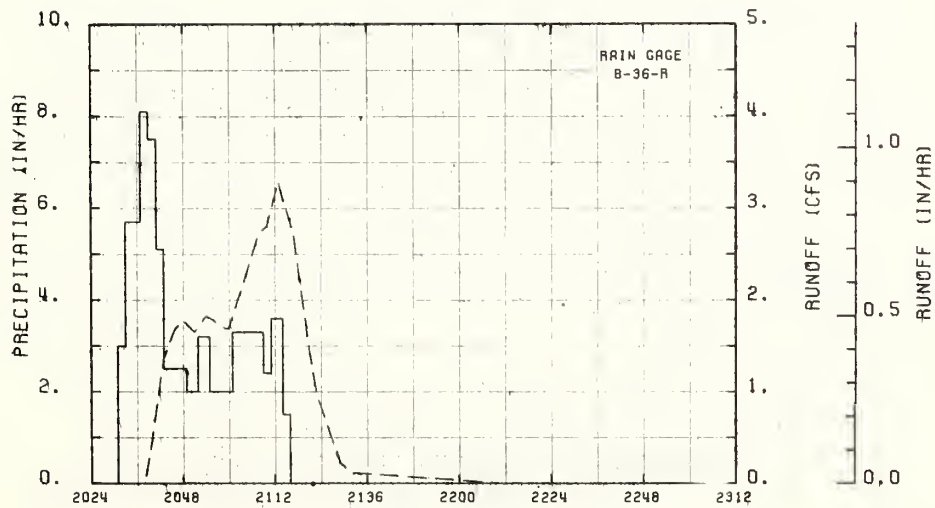
JUNE 16 1957

A121

WATERSHED 1H



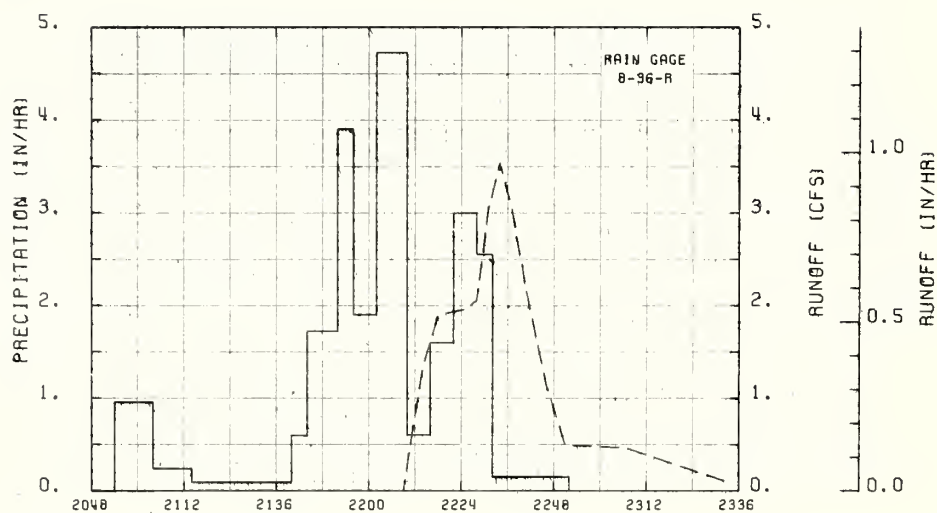
JUNE 12 1958



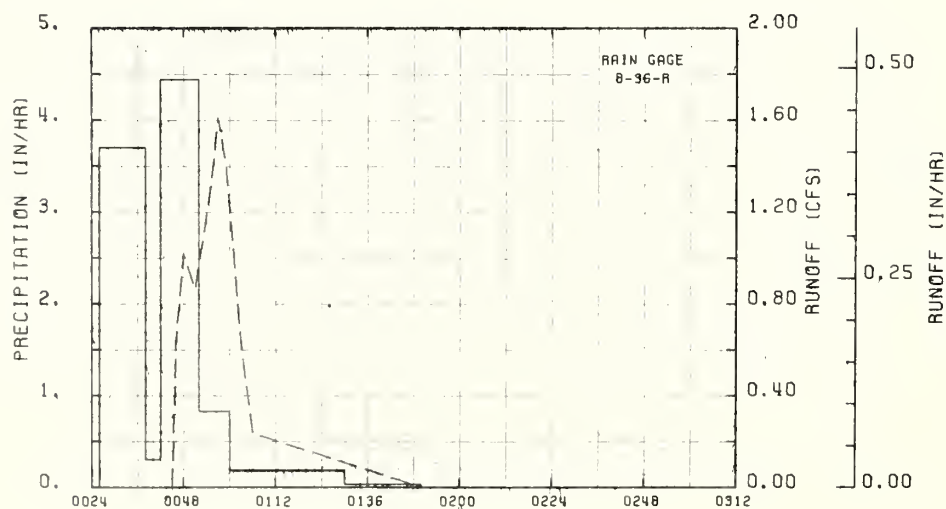
JULY 3 1959

A122

WATERSHED 1H



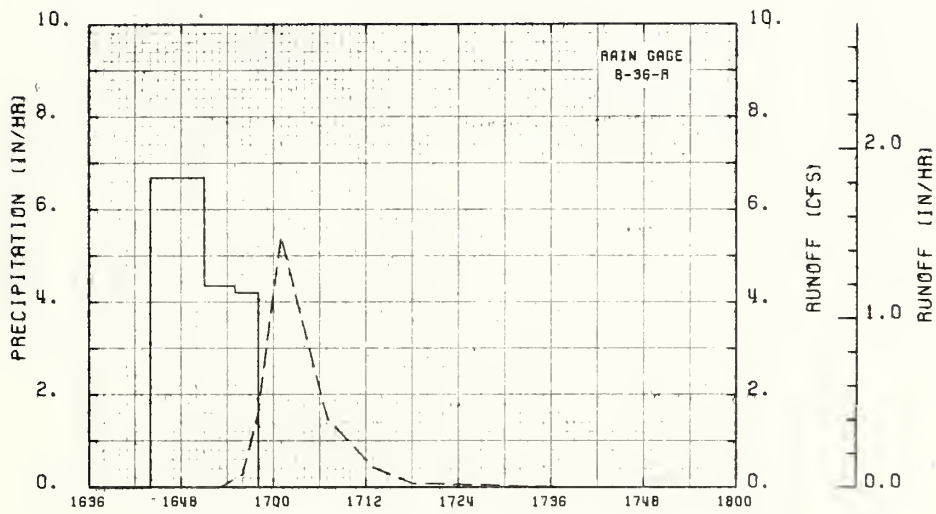
MAY 15 1960



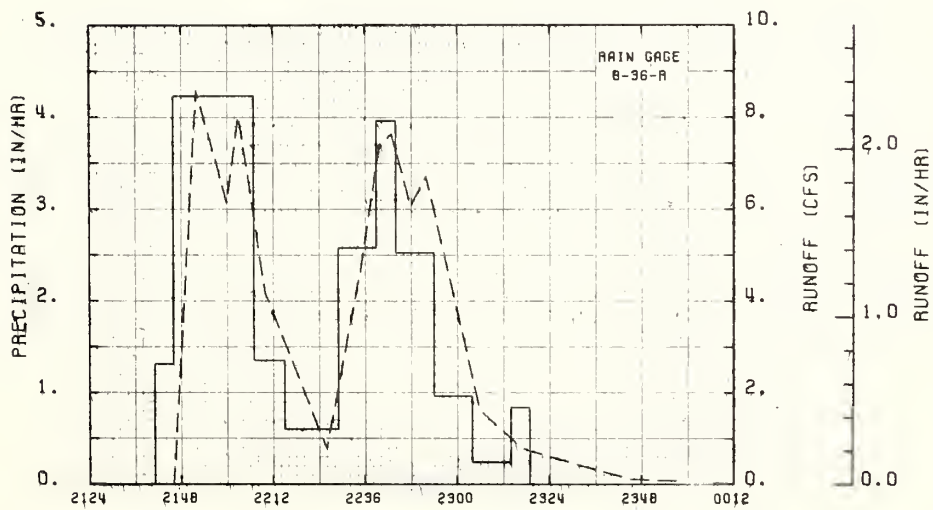
AUGUST 11 1961

A123

WATERSHED 1H



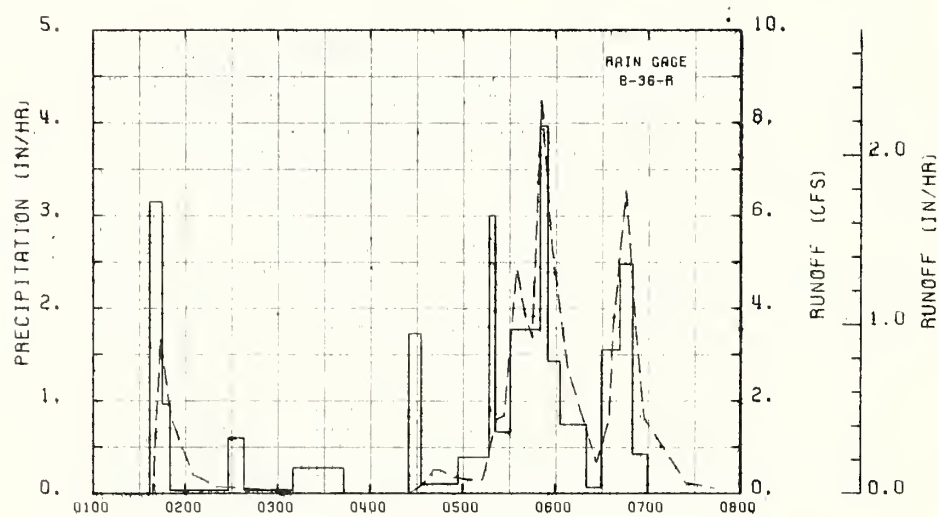
JULY 26 1964



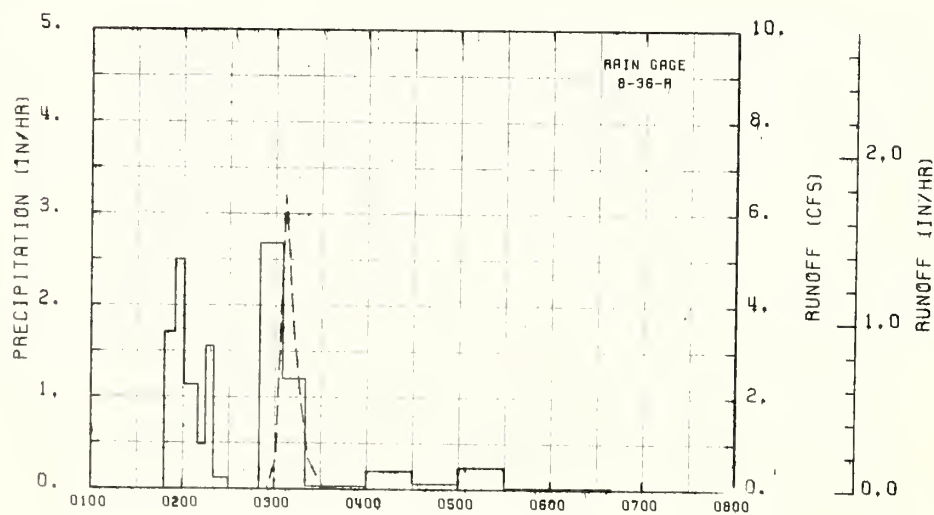
MAY 21 1965

AI24

WATERSHED 1H



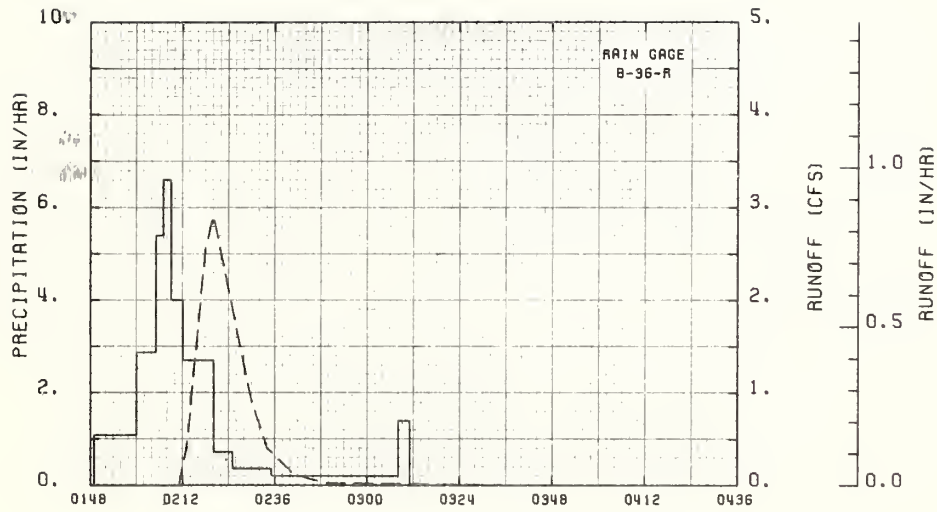
MAY 22 1965



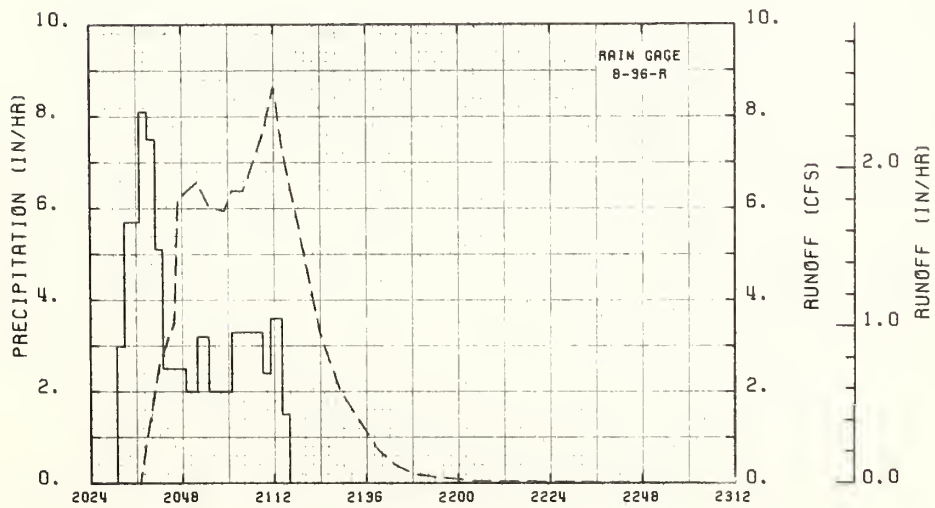
JULY 8 1967

A125

WATERSHED 2H



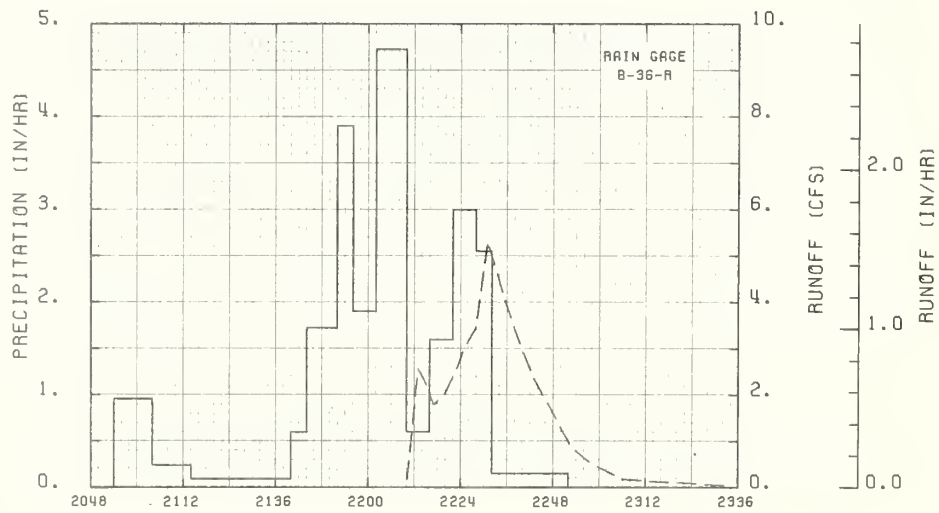
JUNE 12 1958



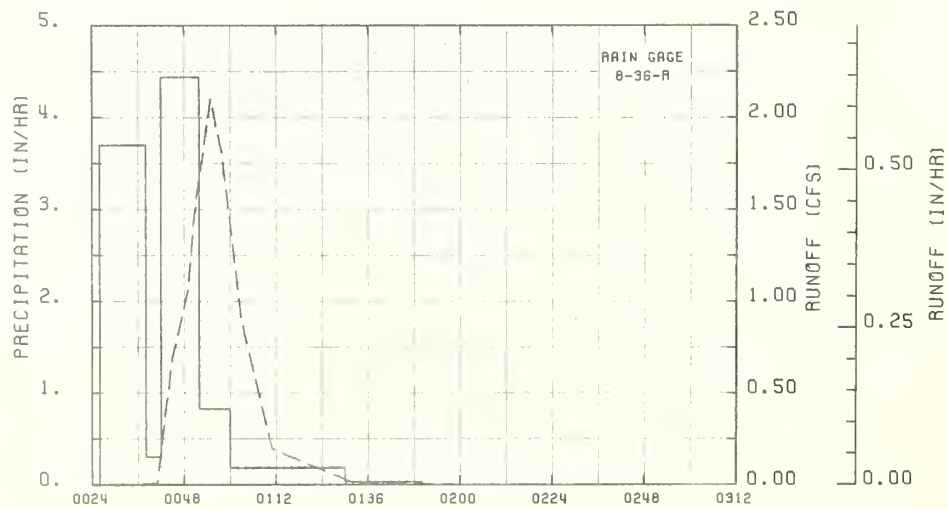
JULY 3 1959

A126

WATERSHED 2H



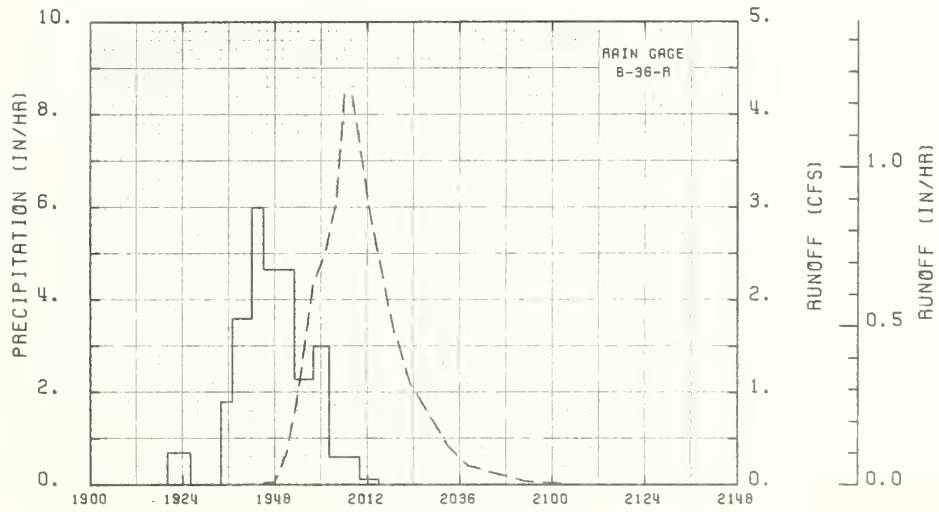
MAY 15 1960



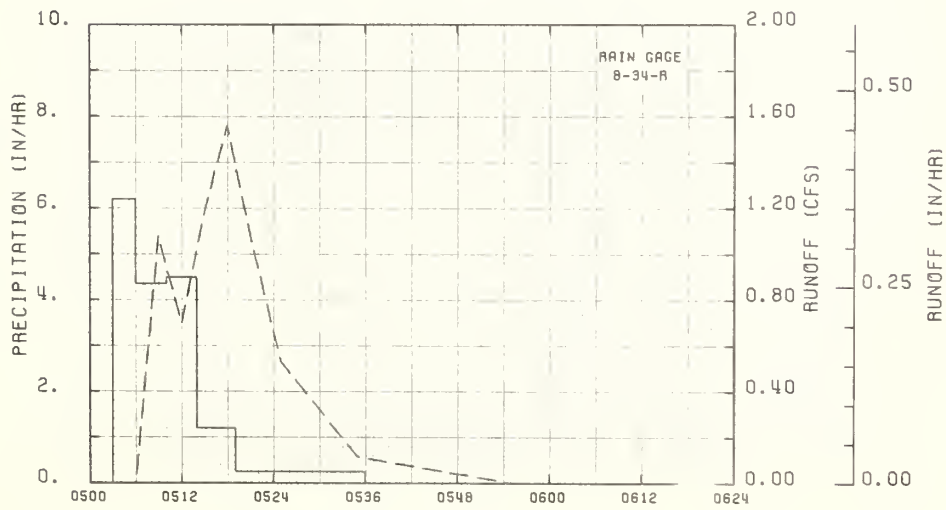
AUGUST 11 1961

AI27

WATERSHED 2H

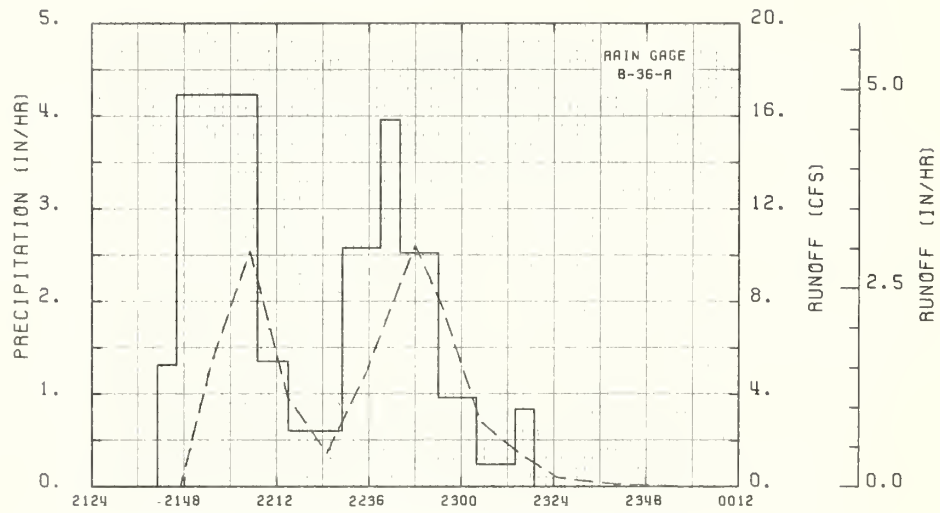


AUGUST 23 1962

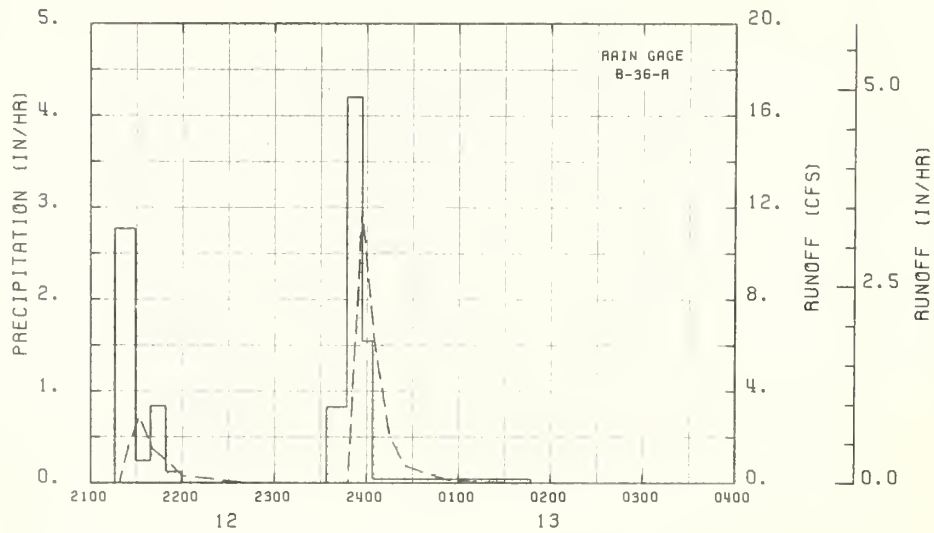


JUNE 21 1964

WATERSHED 2H



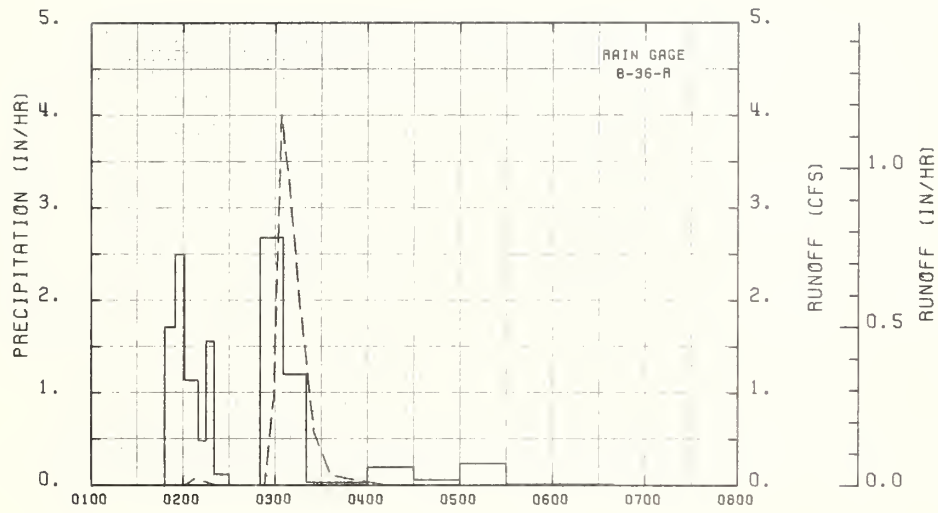
MAY 21 1965



JUNE 12-13 1965

A129

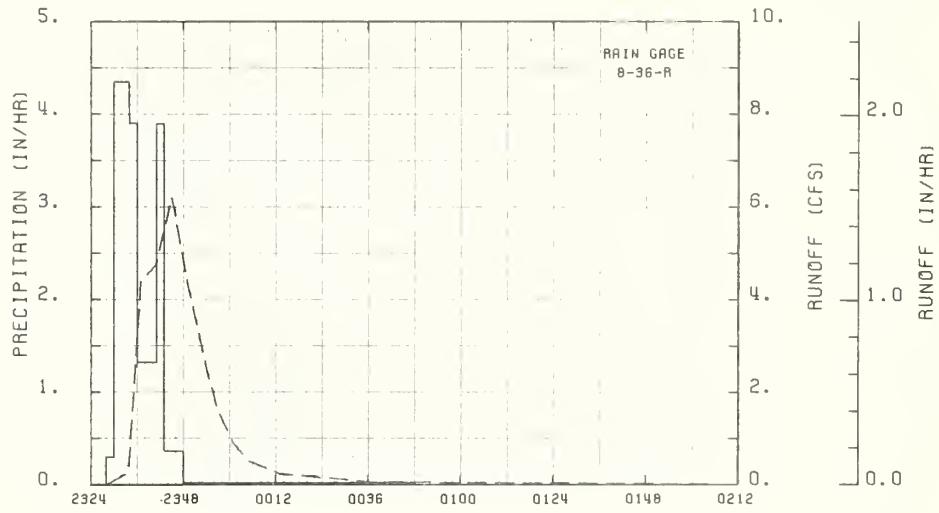
WATERSHED 2H



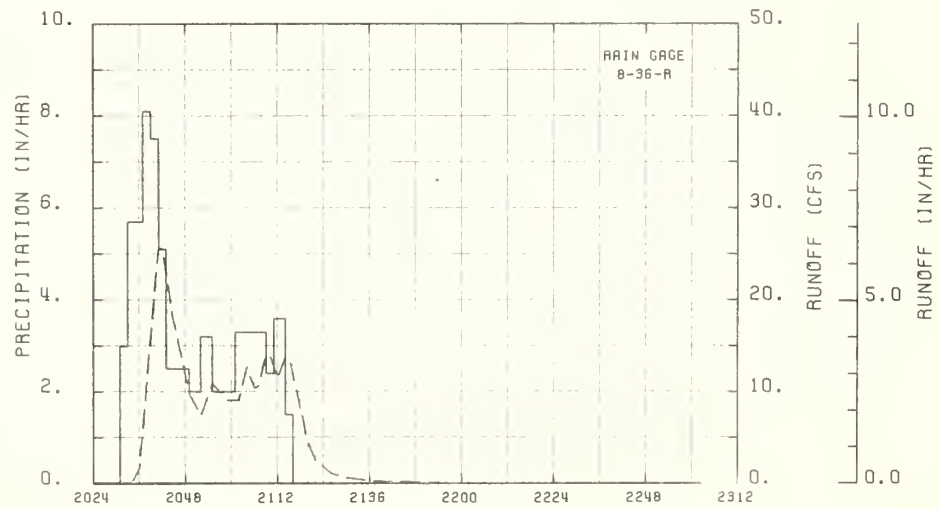
JULY 8 1967

A130

WATERSHED 3H



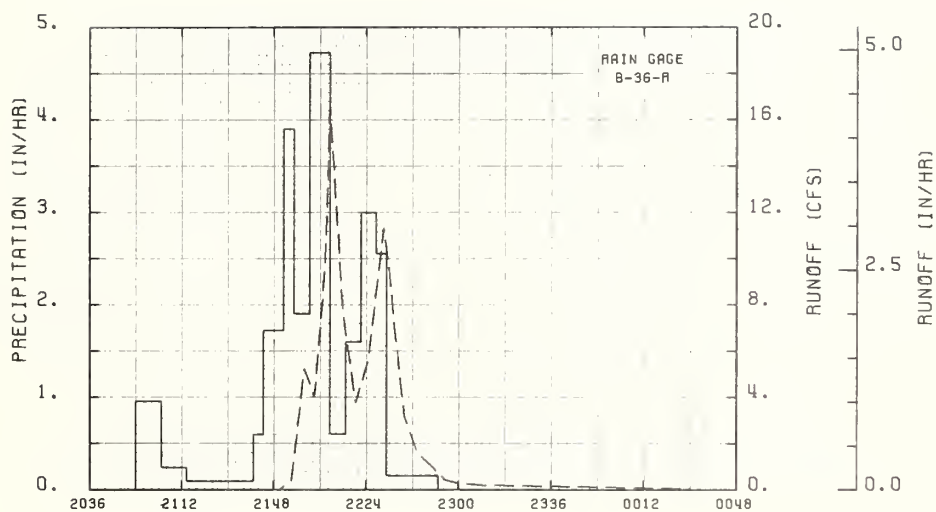
JULY 18 1958



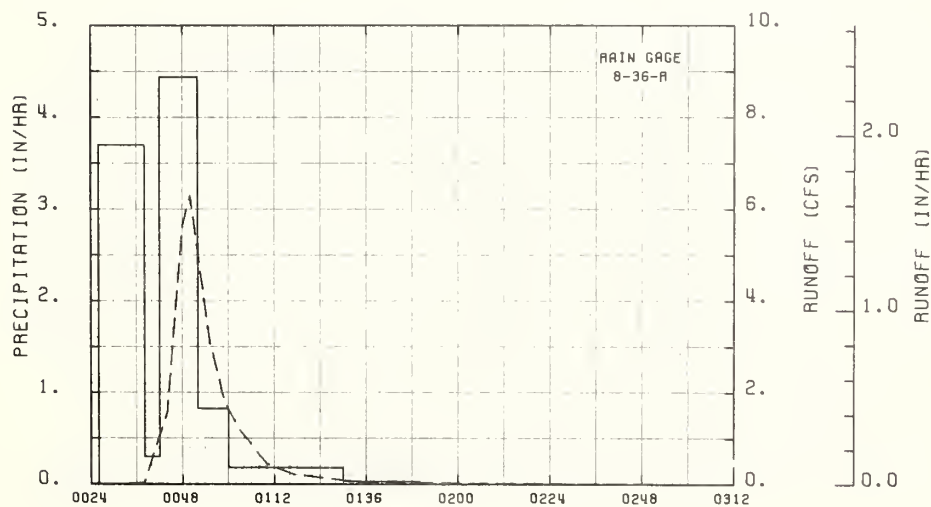
JULY 3 1959

A131

WATERSHED 3H

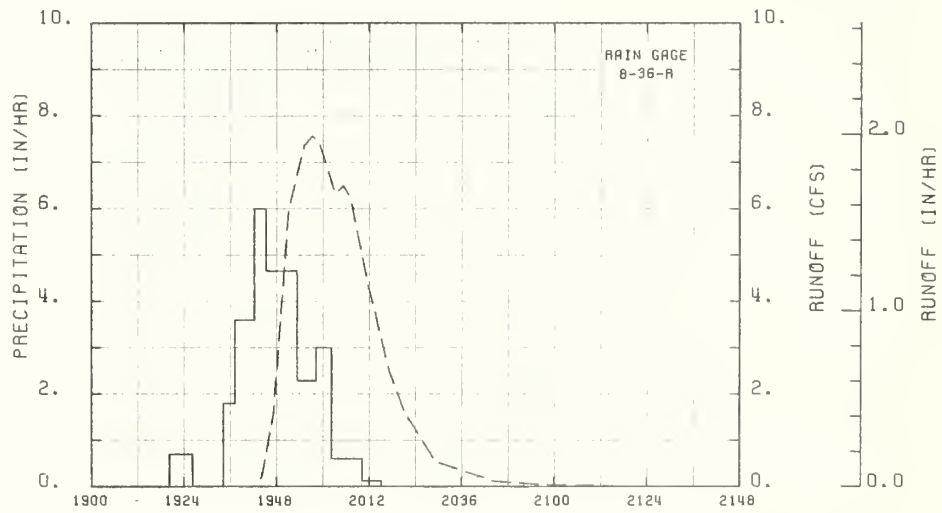


MAY 15 1960

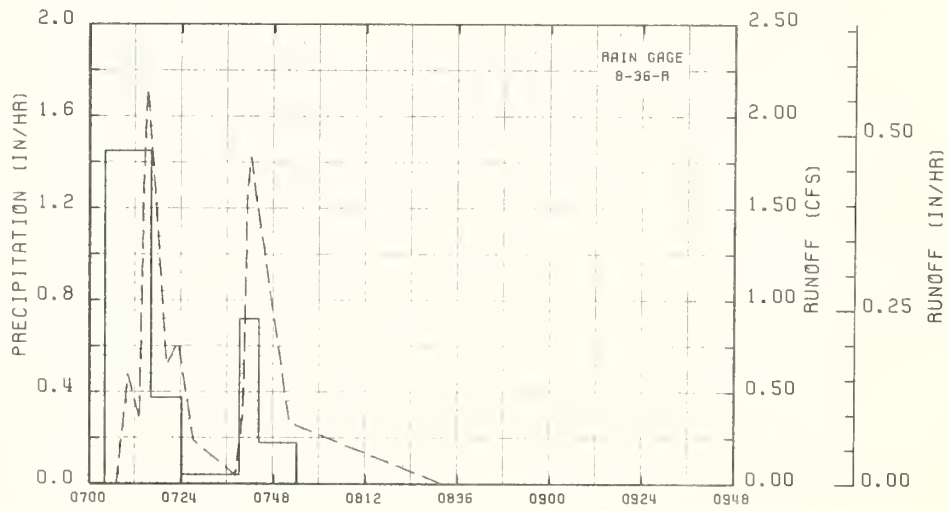


AUGUST 11 1961

WATERSHED 3H



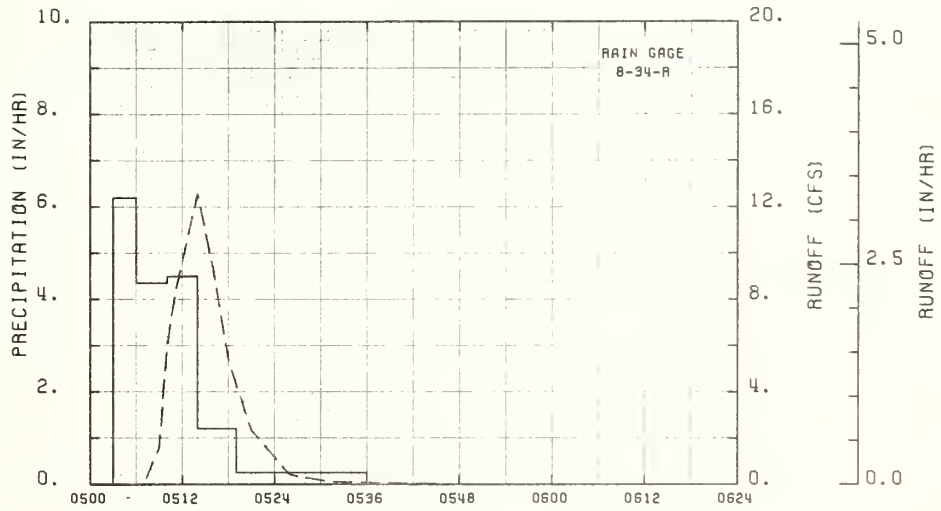
AUGUST 23 1962



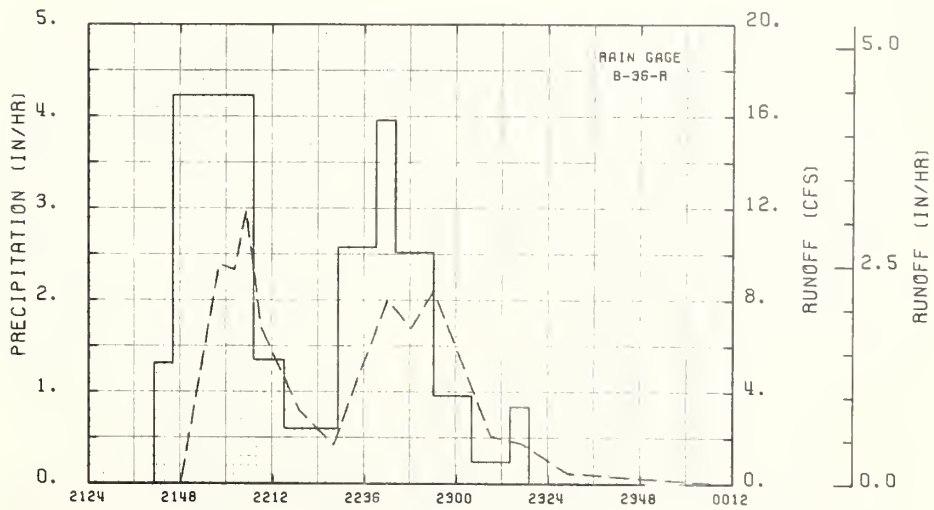
OCTOBER 17 1963

A133

WATERSHED 3H

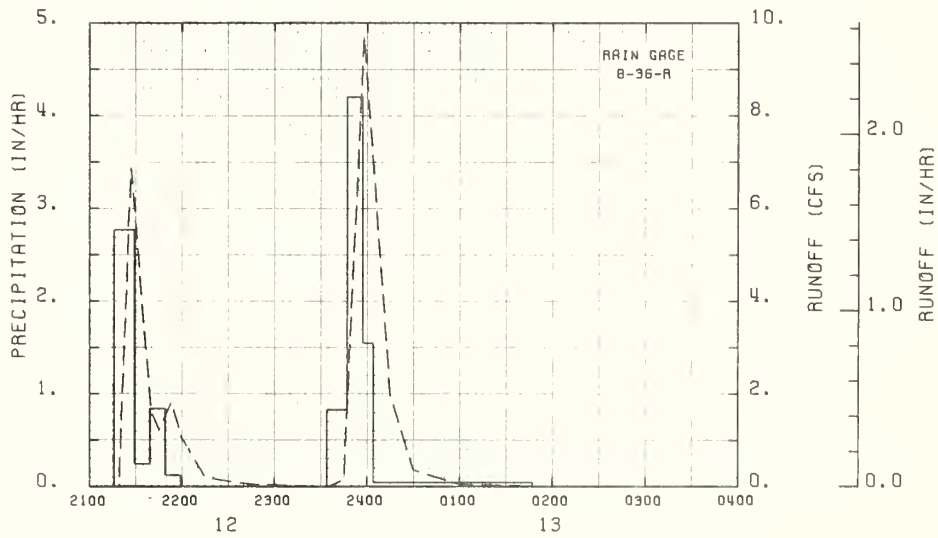


JUNE 21 1964

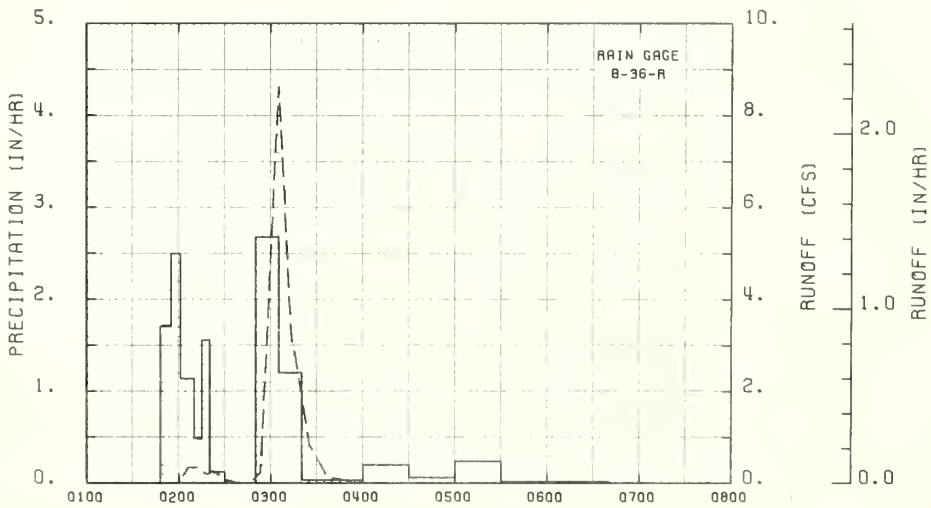


MAY 21 1965

WATERSHED 3H

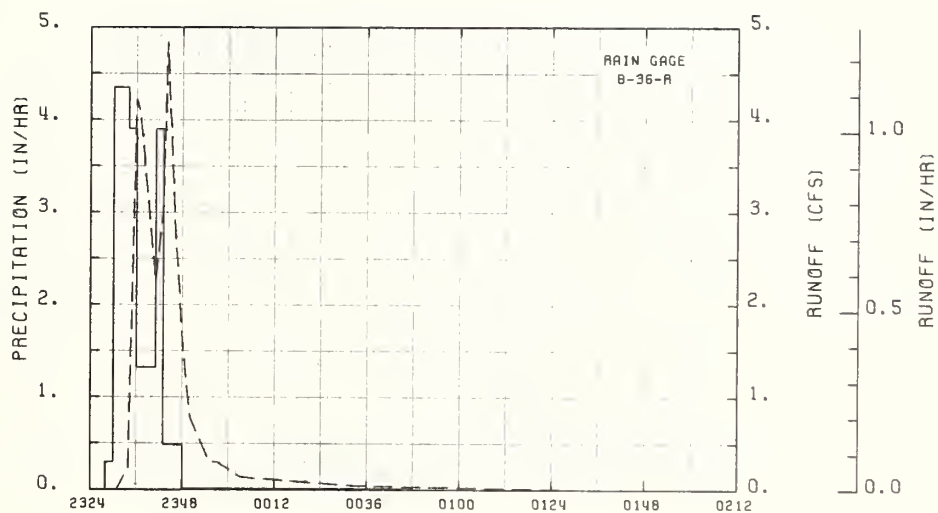


JUNE 12-13 1965

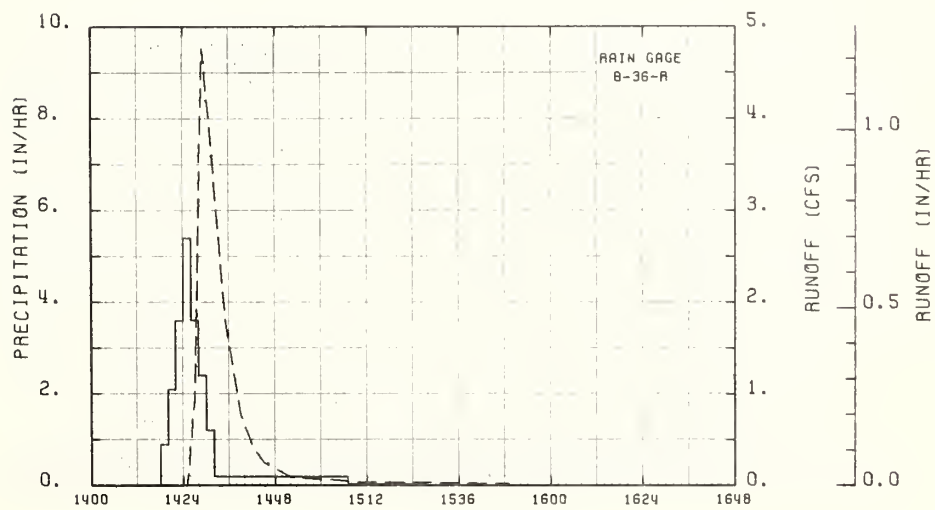


JULY 8 1967

WATERSHED 4 H

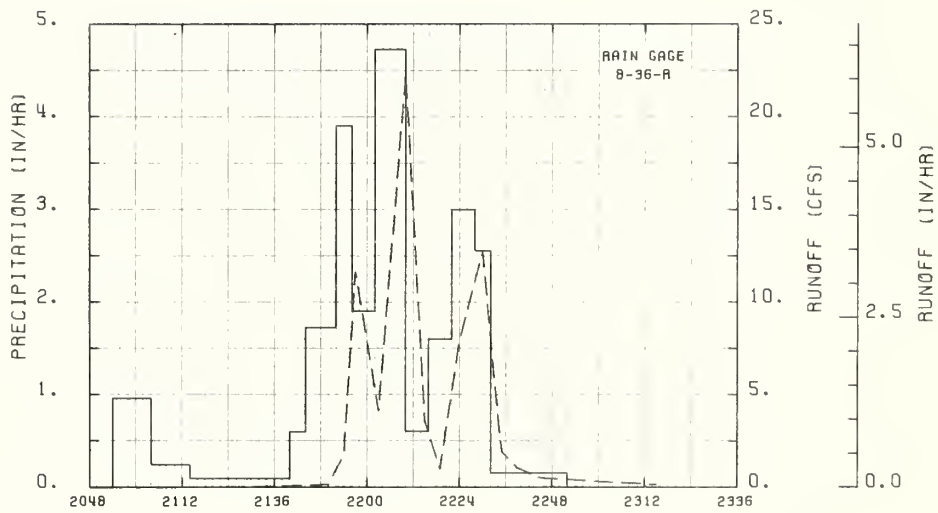


JULY 18 1958

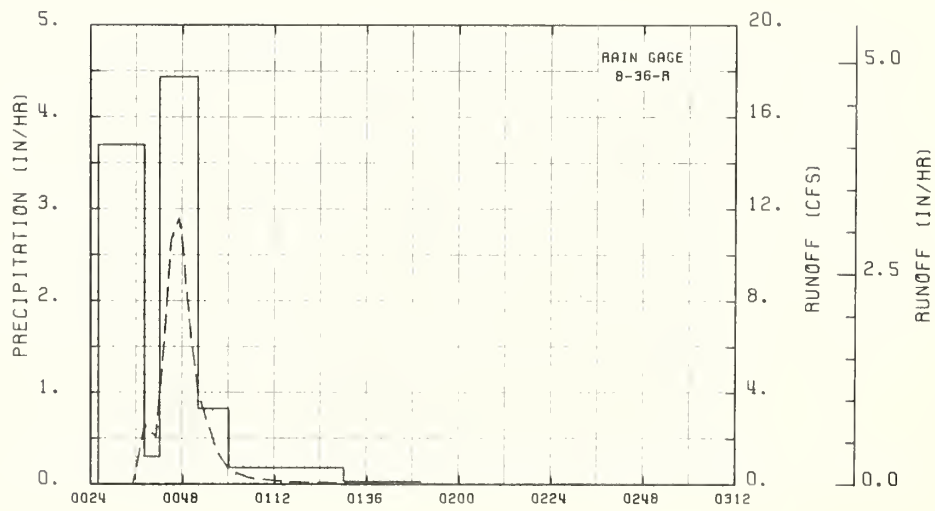


MAY 4 1959

WATERSHED 4H

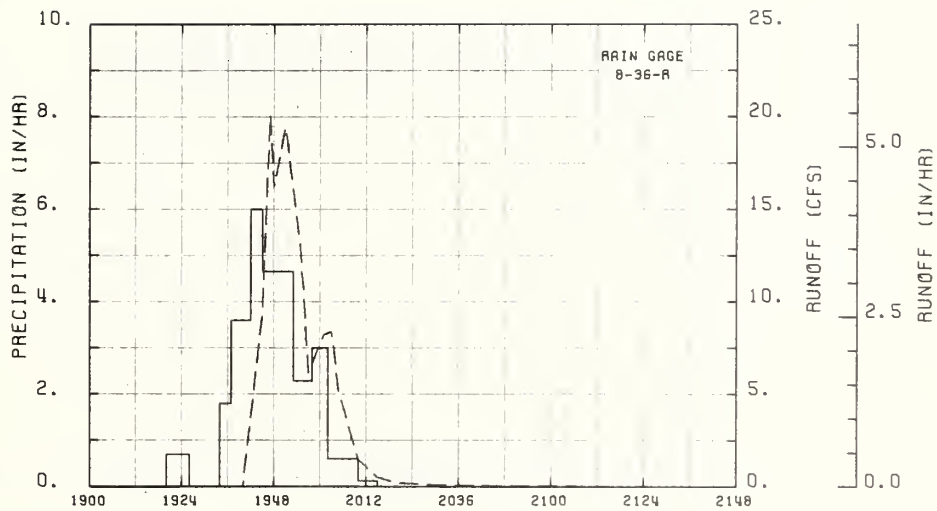


MAY 15 1960

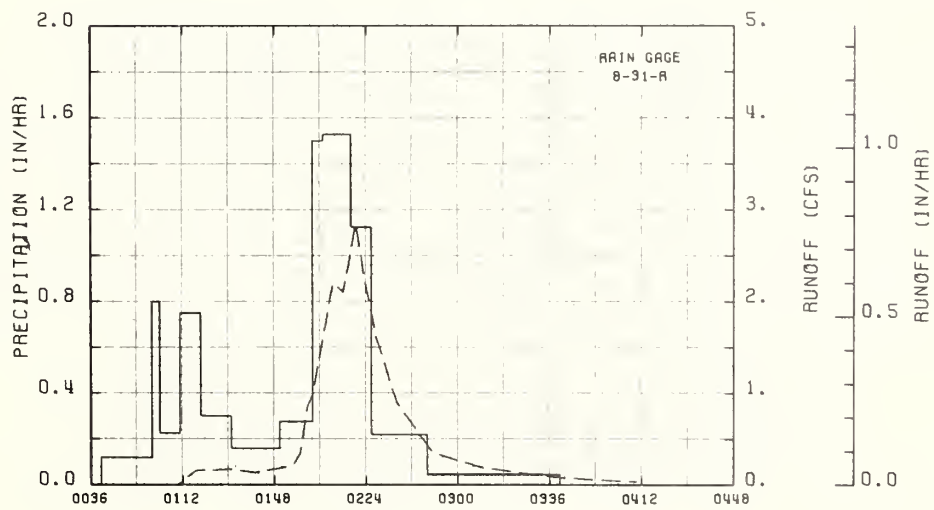


AUGUST 11 1961

WATERSHED 4H



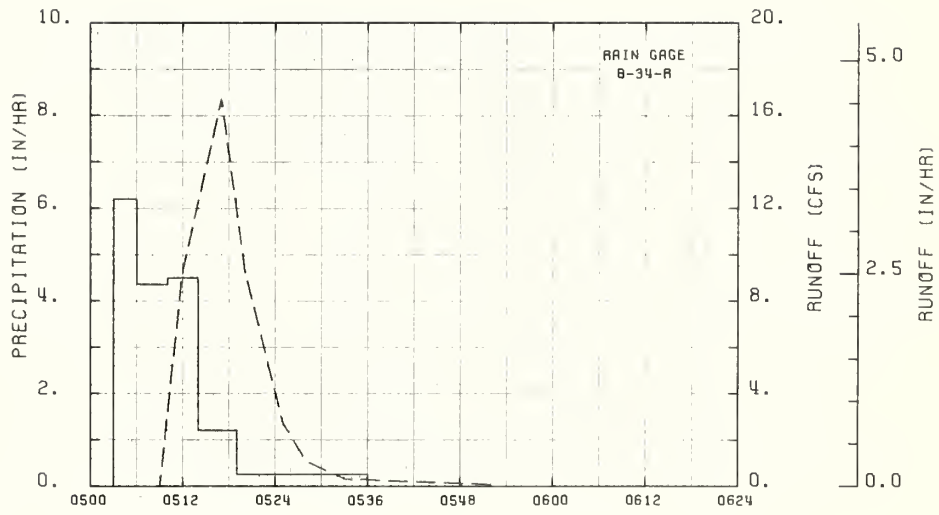
AUGUST 23 1962



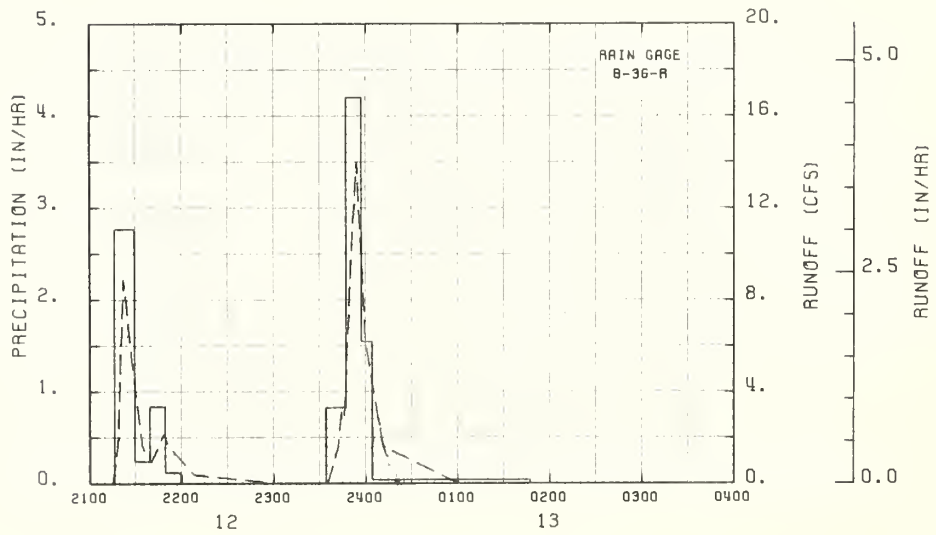
SEPTEMBER 10 1963

A138

WATERSHED 4H

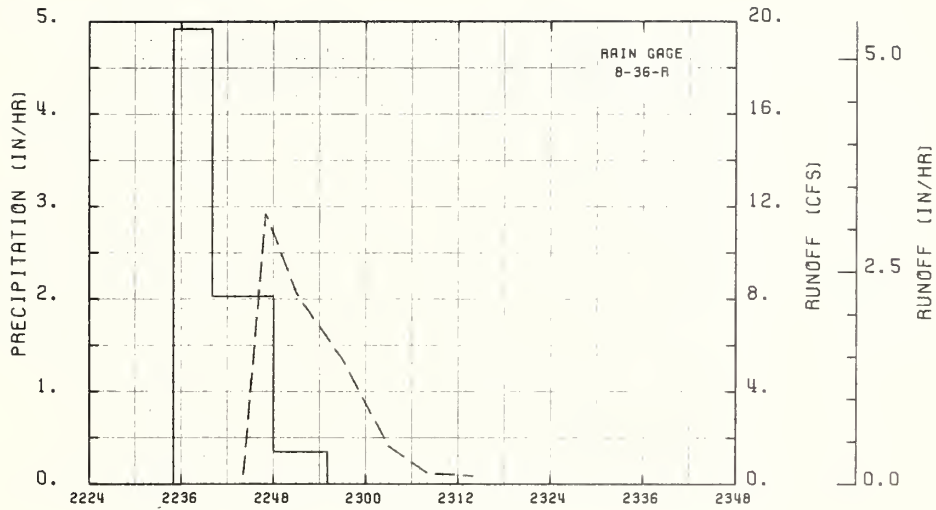


JUNE 21 1964

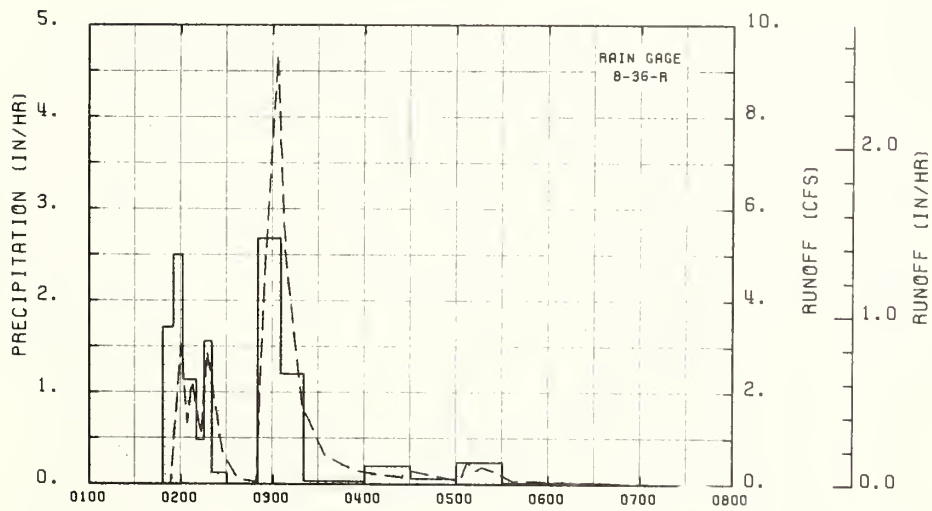


JUNE 12-13 1965

WATERSHED 4H



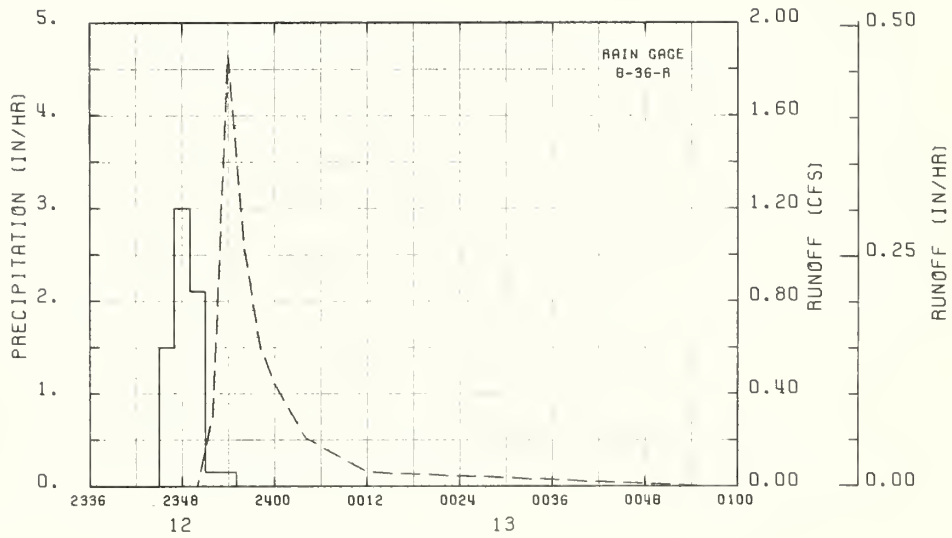
JUNE 29 1965



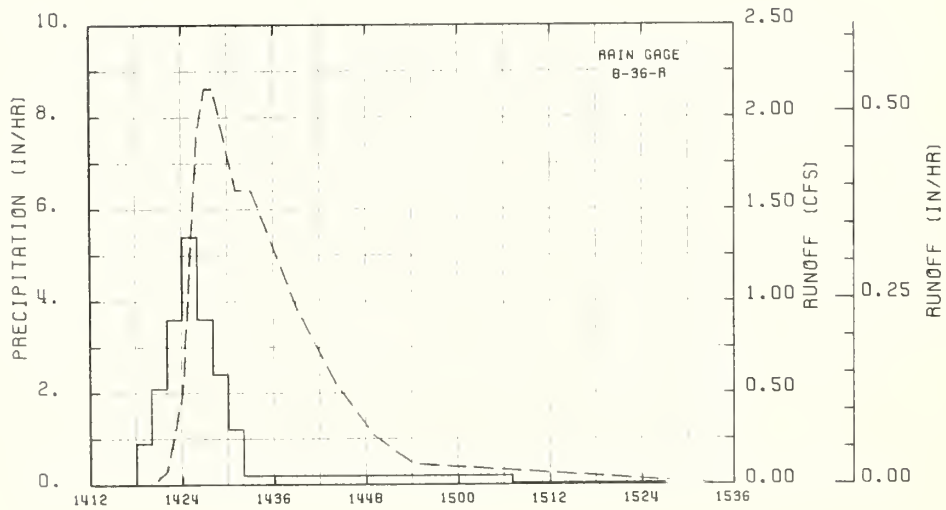
JULY 8 1967

A140

WATERSHED 5H



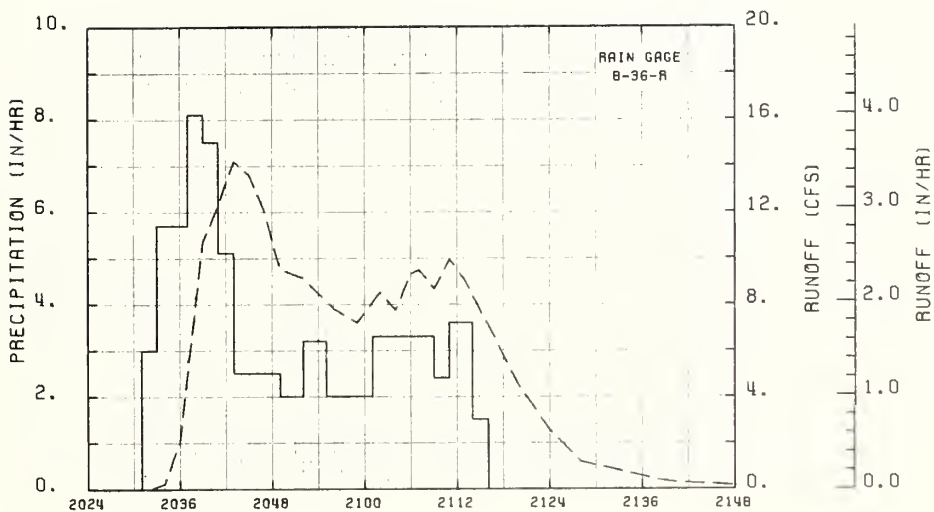
JUNE 12-13 1958



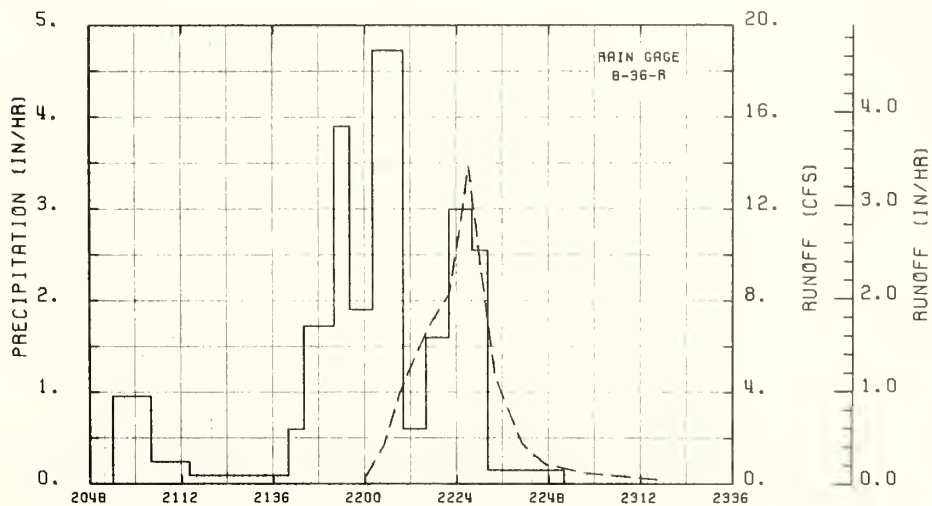
MAY 4 1959

A141

WATERSHED 5H



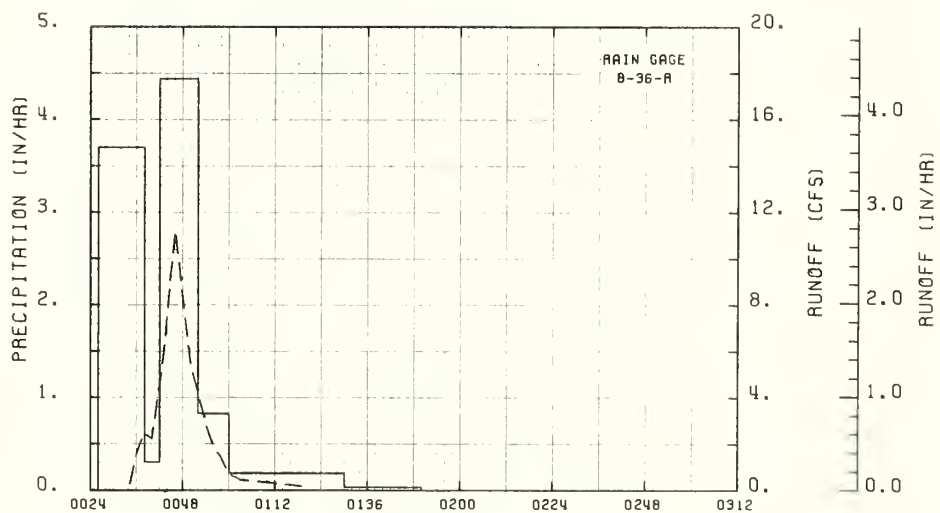
JULY 3 1959



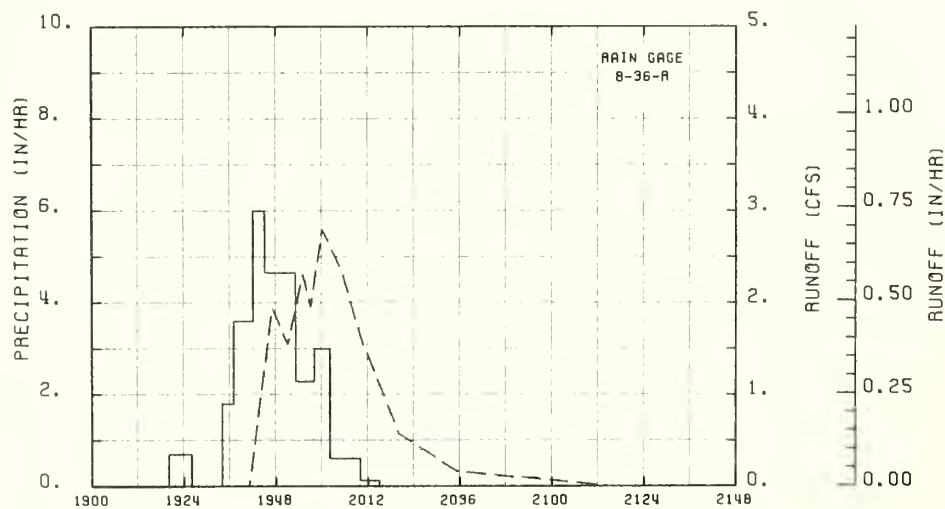
MAY 15 1960

A142

WATERSHED 5H



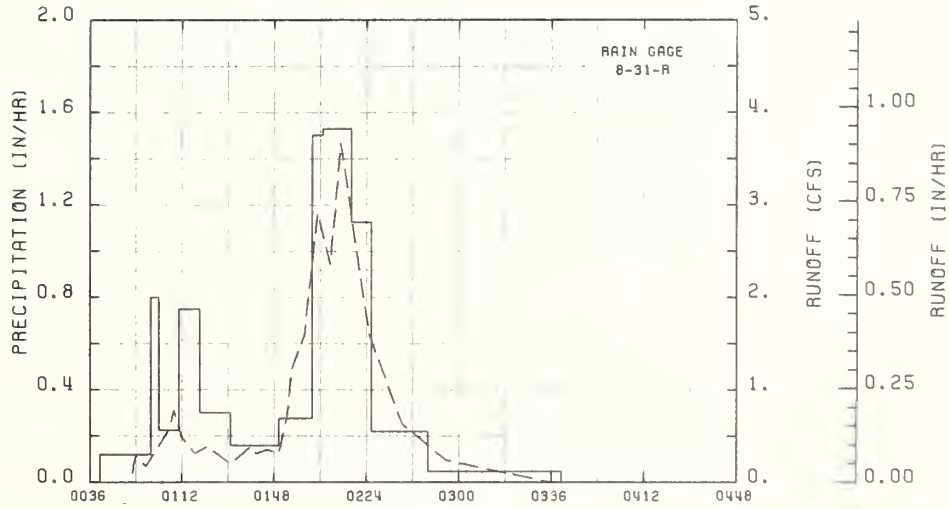
AUGUST 11 1961



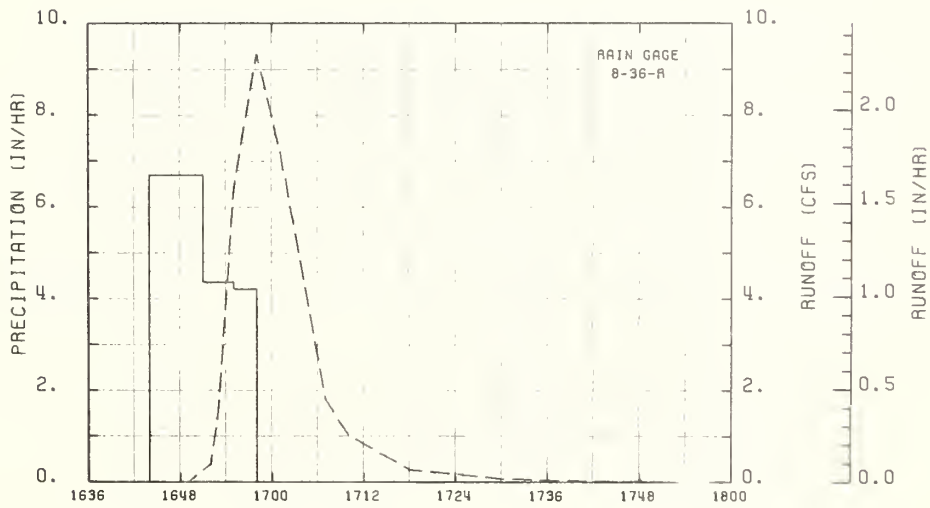
AUGUST 23 1962

A143

WATERSHED 5H



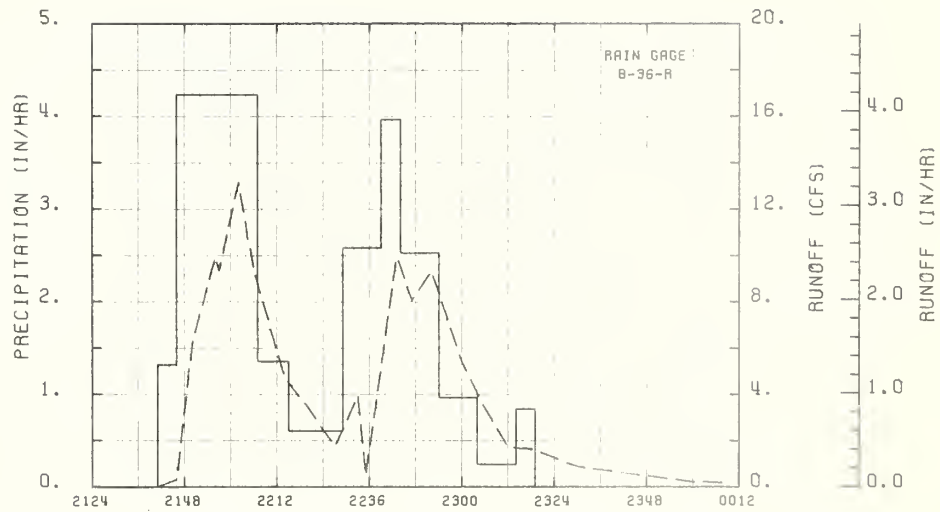
SEPTEMBER 10 1963



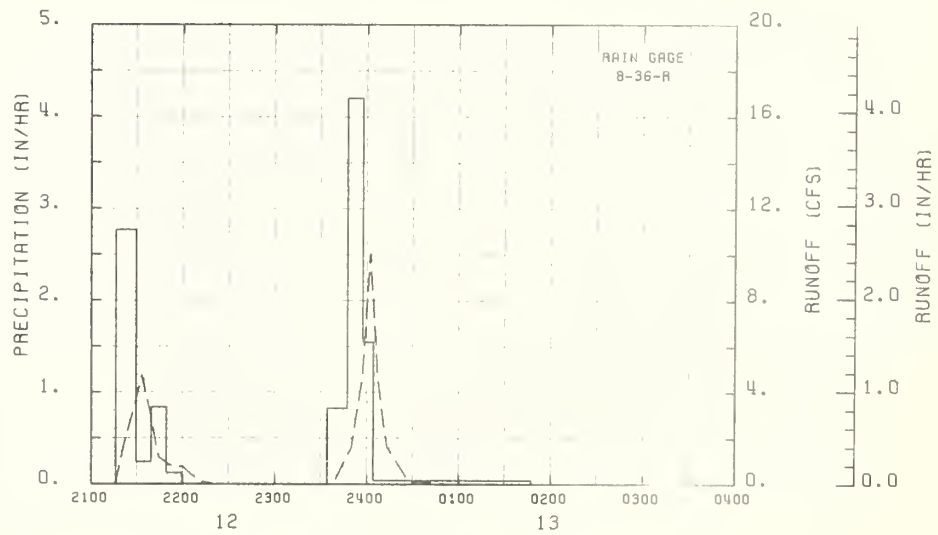
JULY 26 1964

A144

WATERSHED 5H



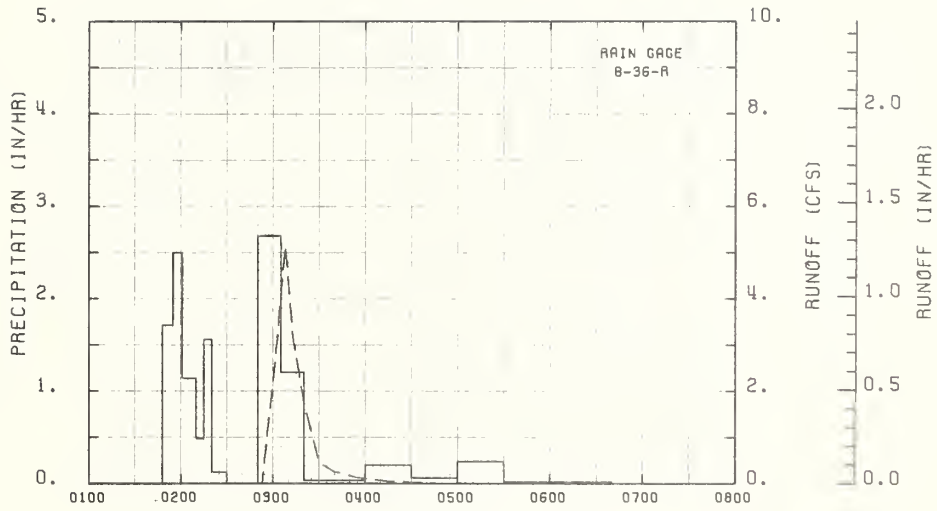
MAY 21 1965



JUNE 12-13 1965

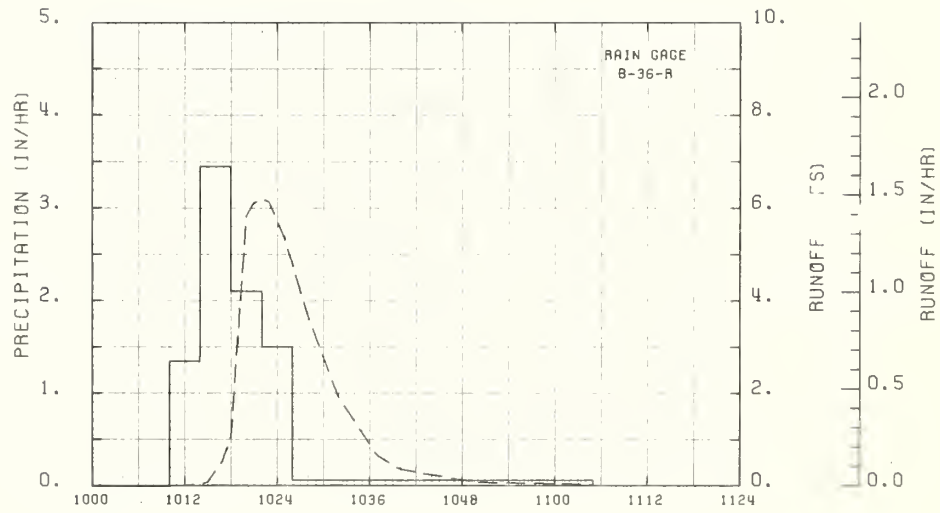
A145

WATERSHED 5H

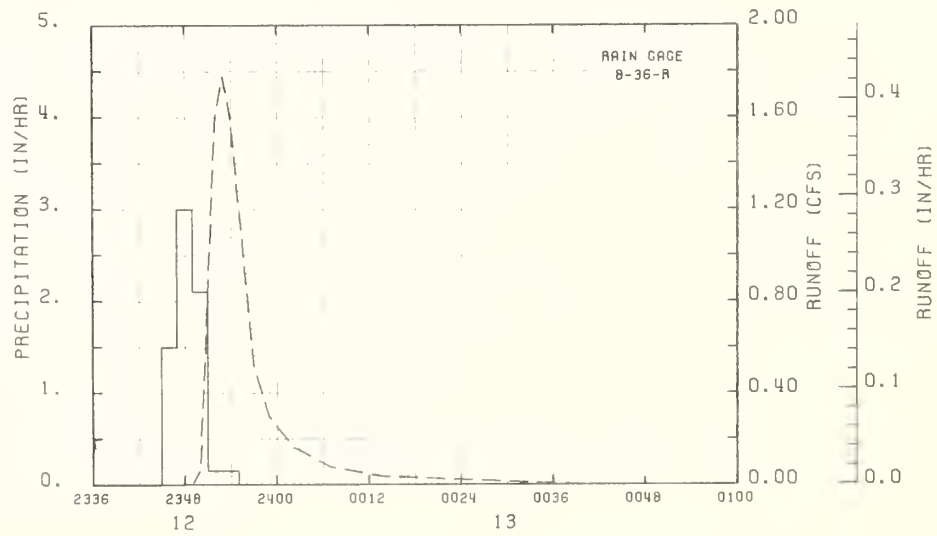


JULY 8 1967

WATERSHED 6H

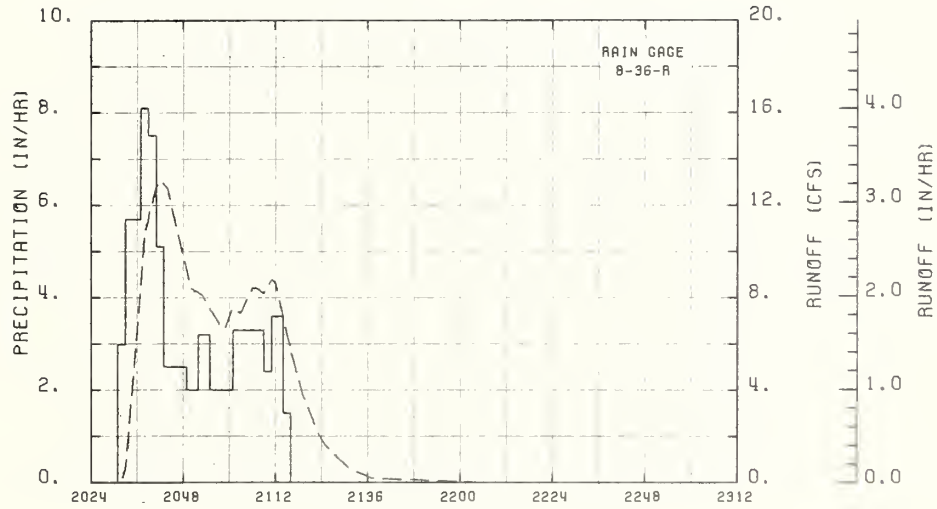


JUNE 27 1956

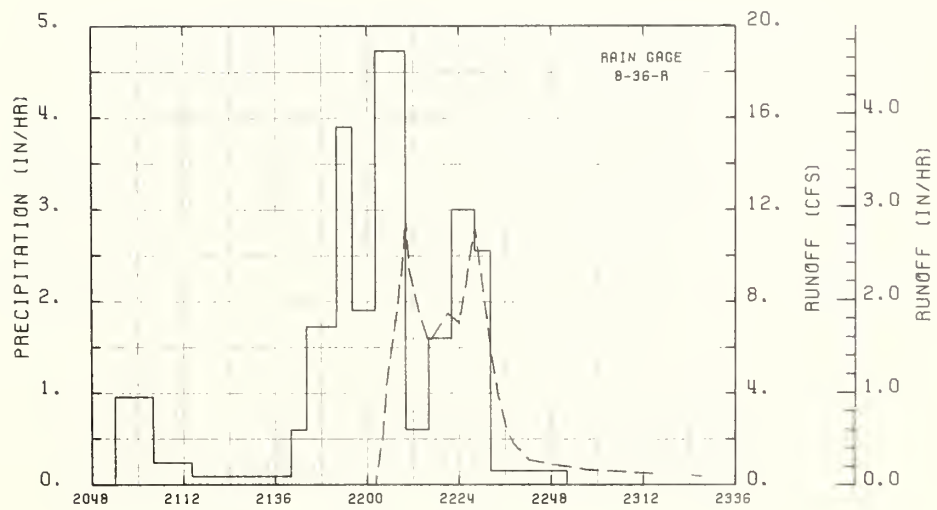


JUNE 12-13 1958

WATERSHED 6H



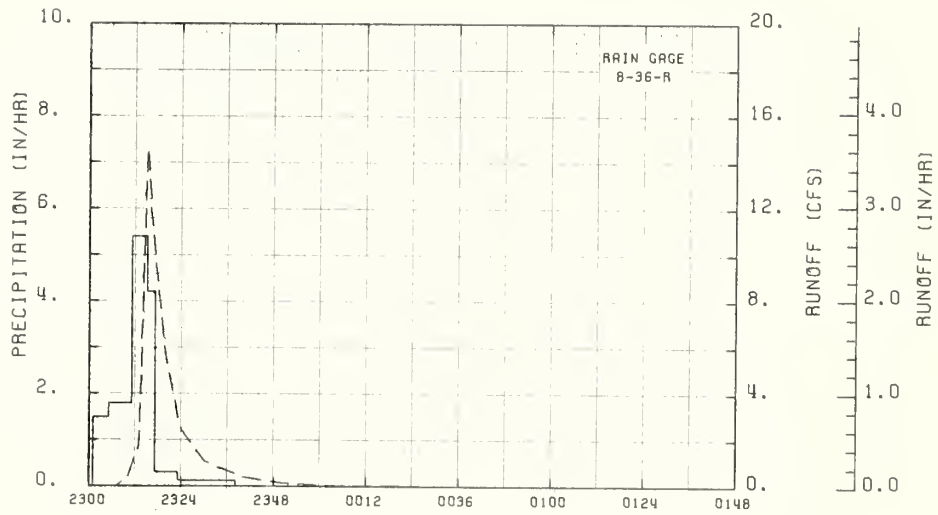
JULY 3 1959



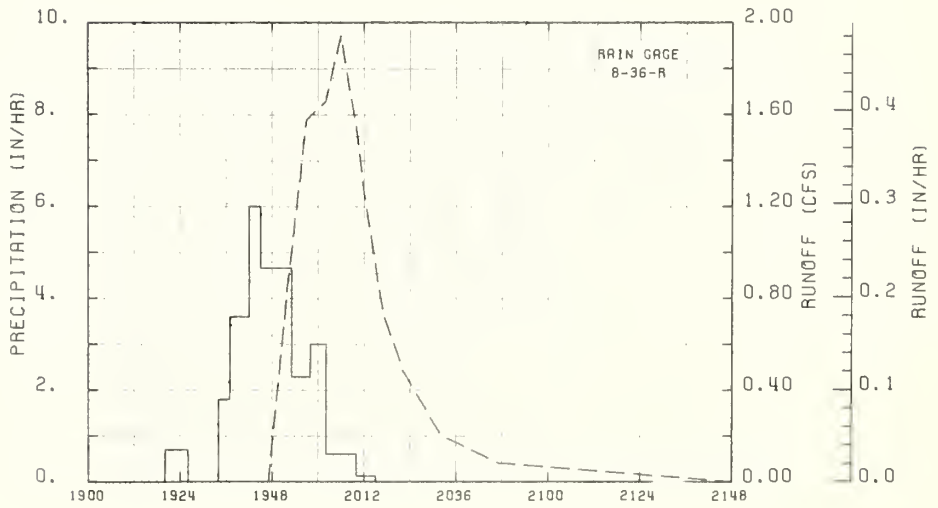
MAY 15 1960

A148

WATERSHED 6H

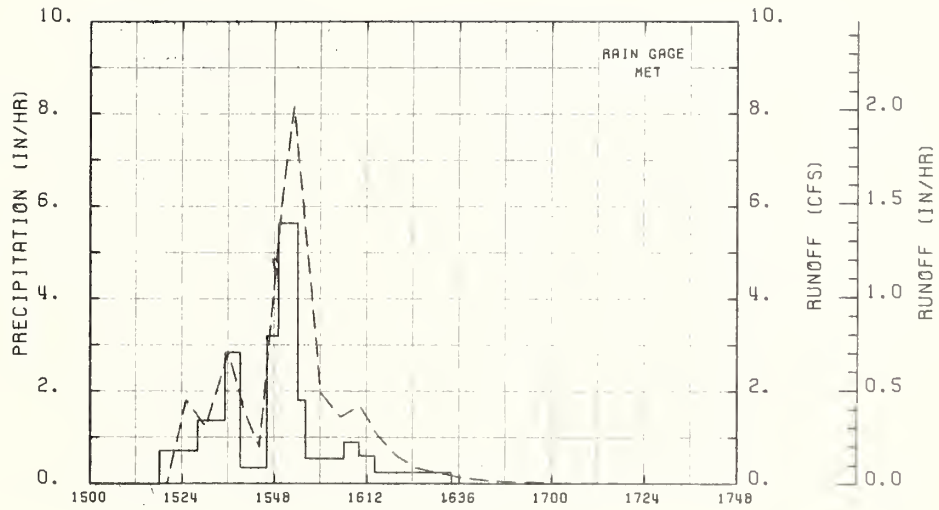


JUNE 14 1960

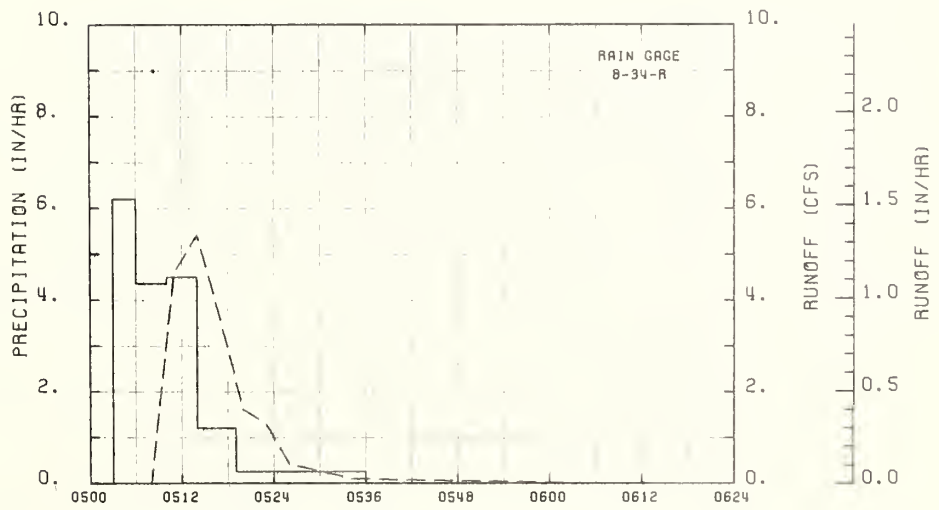


AUGUST 23 1962

WATERSHED 6H



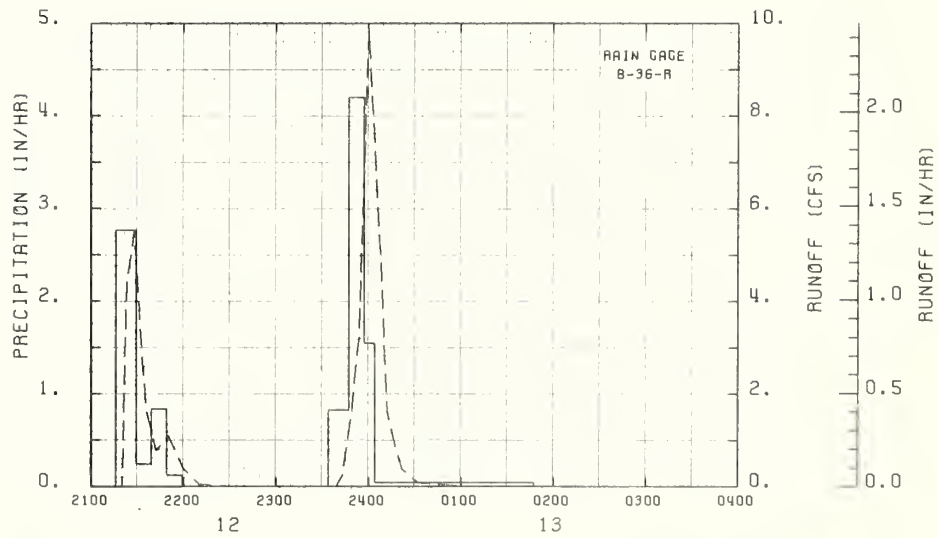
SEPTEMBER 9 1963



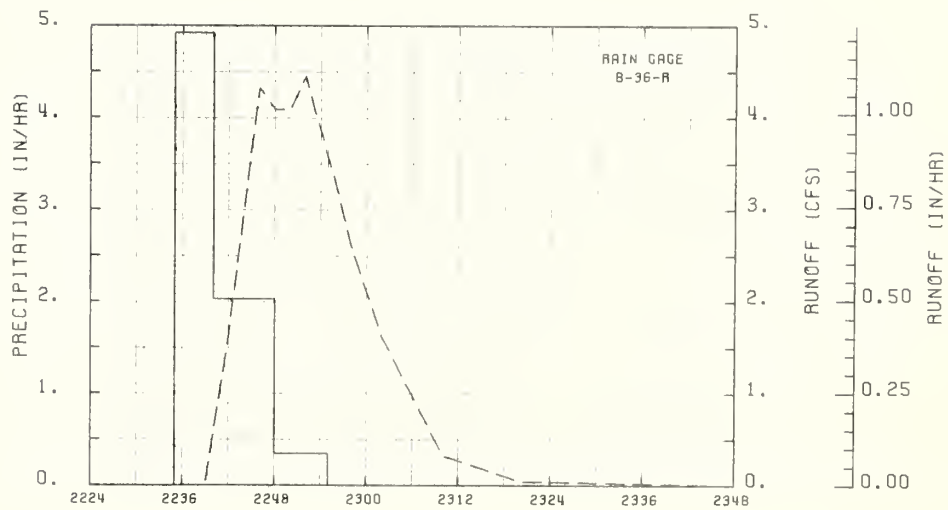
JUNE 21 1964

A150

WATERSHED 6H



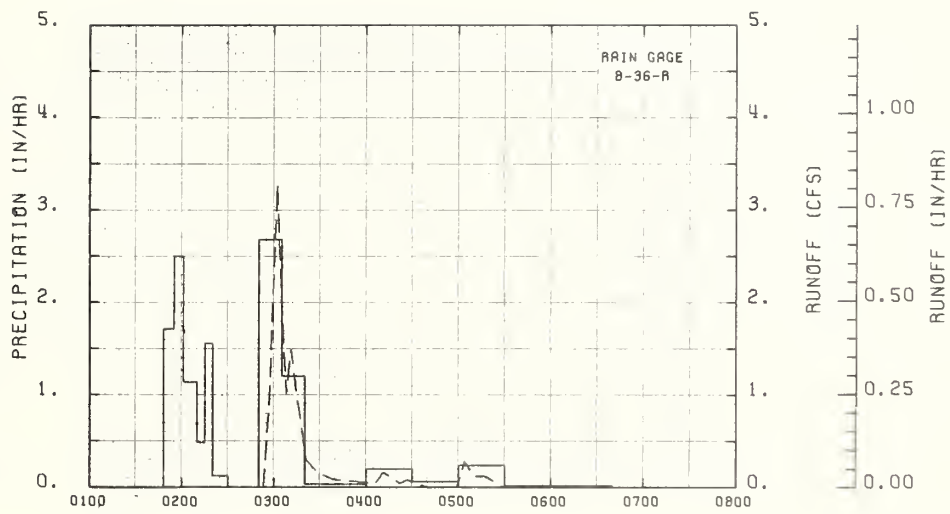
JUNE 12-13 1965



JUNE 29 1965

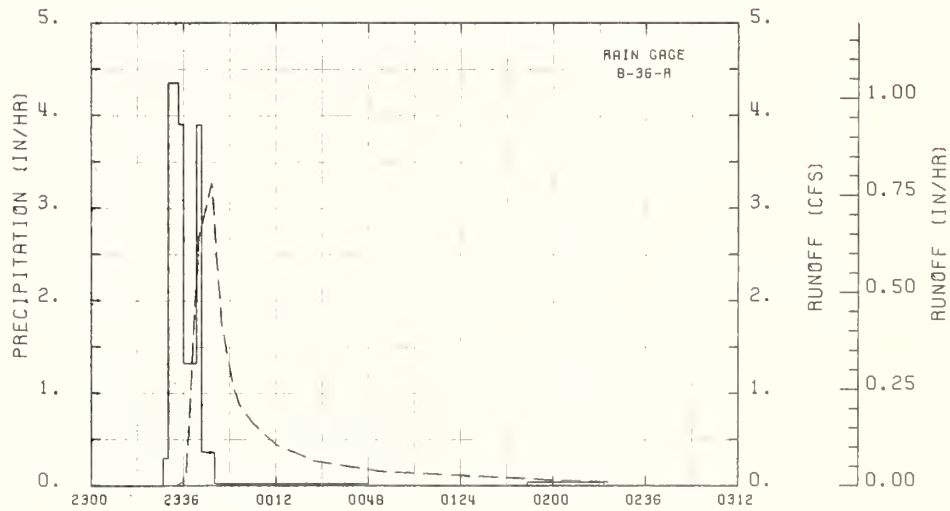
A151

WATERSHED 6H

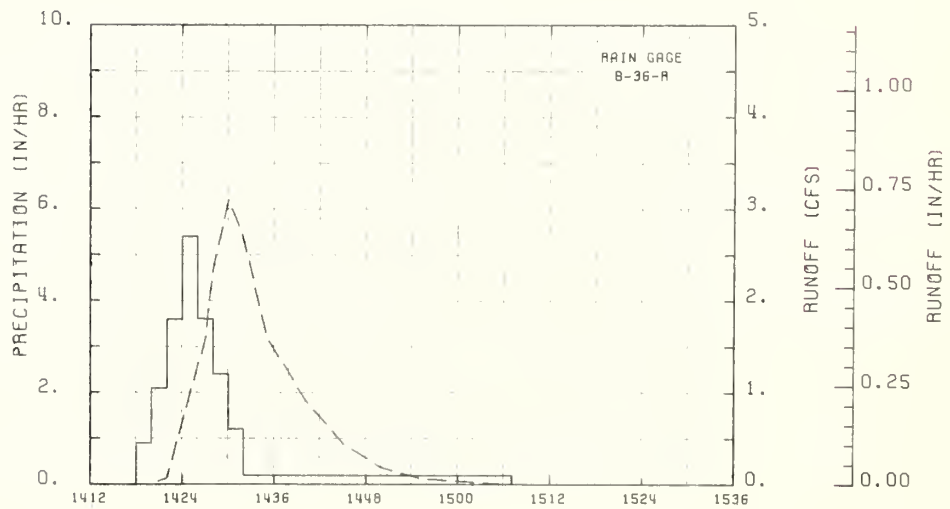


JULY 8 1967

WATERSHED 7H

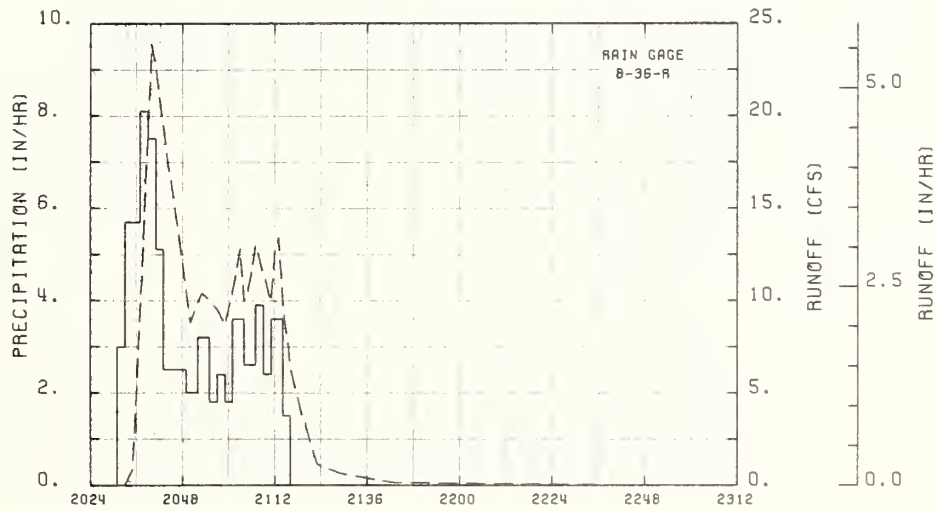


JULY 18 1958

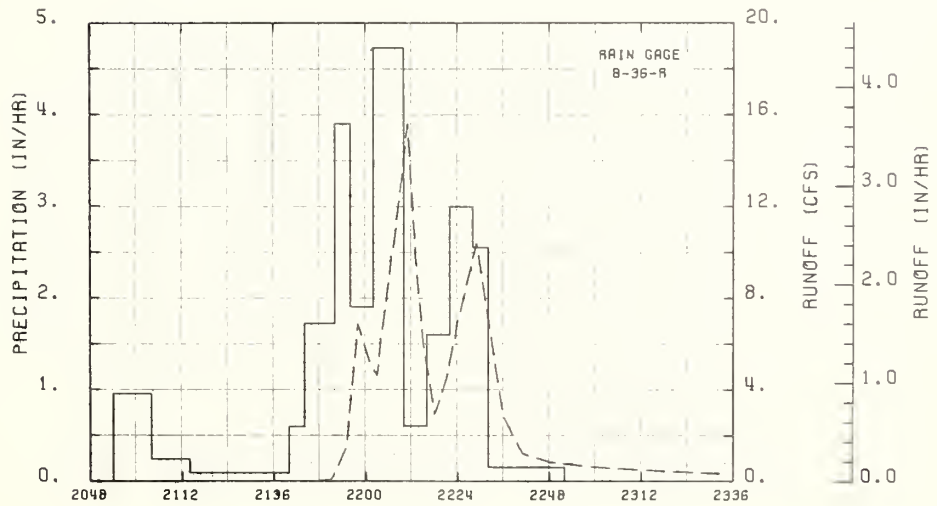


MAY 4 1959

WATERSHED 7H

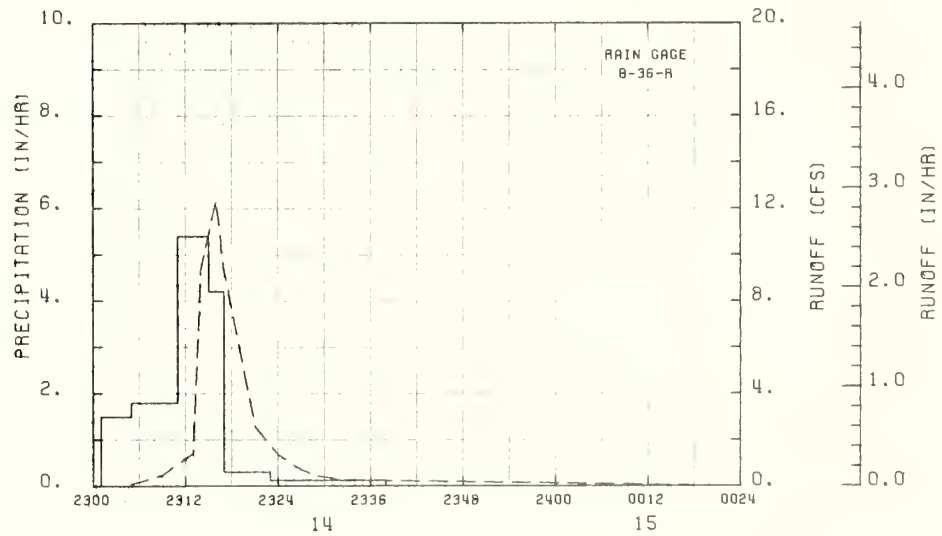


JULY 3 1959

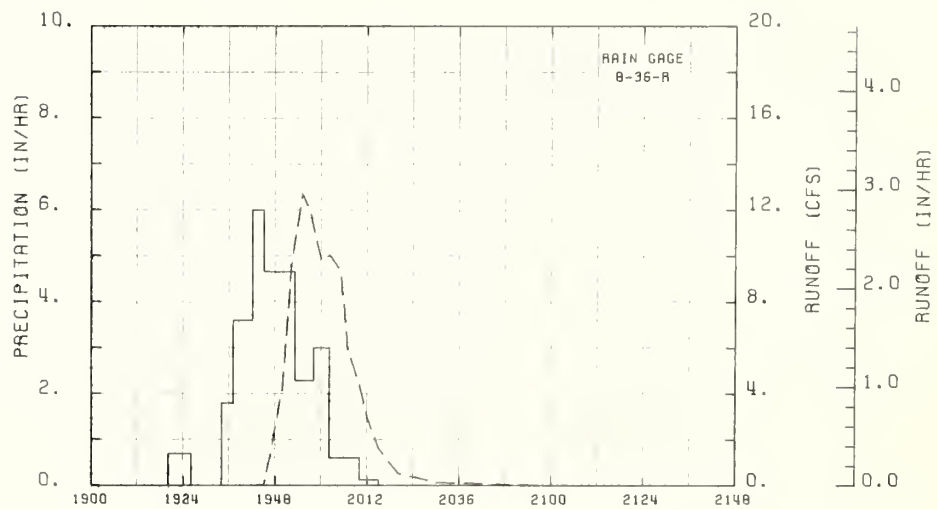


MAY 15 1960

WATERSHED 7H



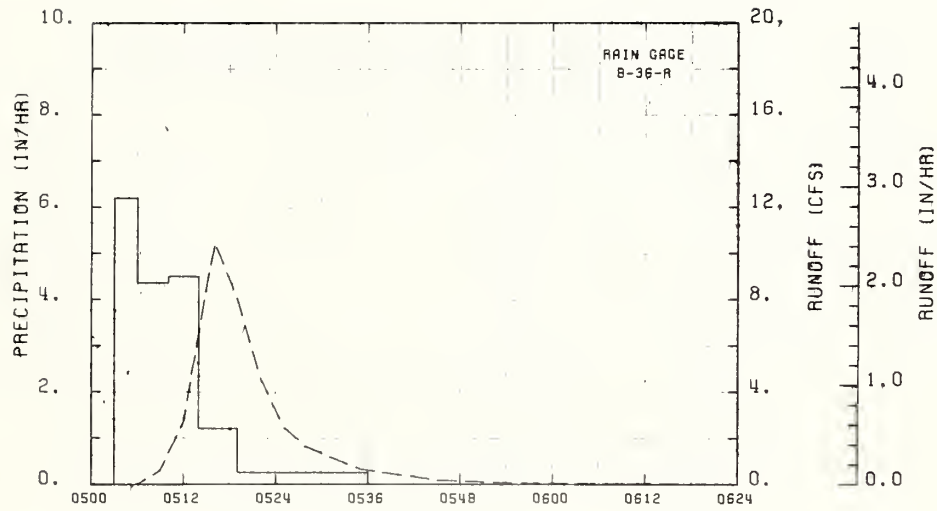
JUNE 14-15 1960



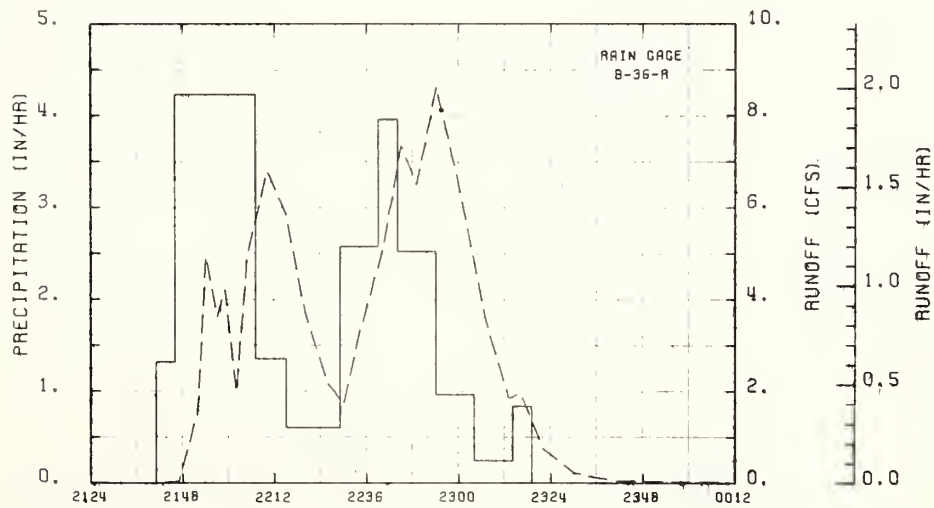
AUGUST 23 1962

A155

WATERSHED 7H



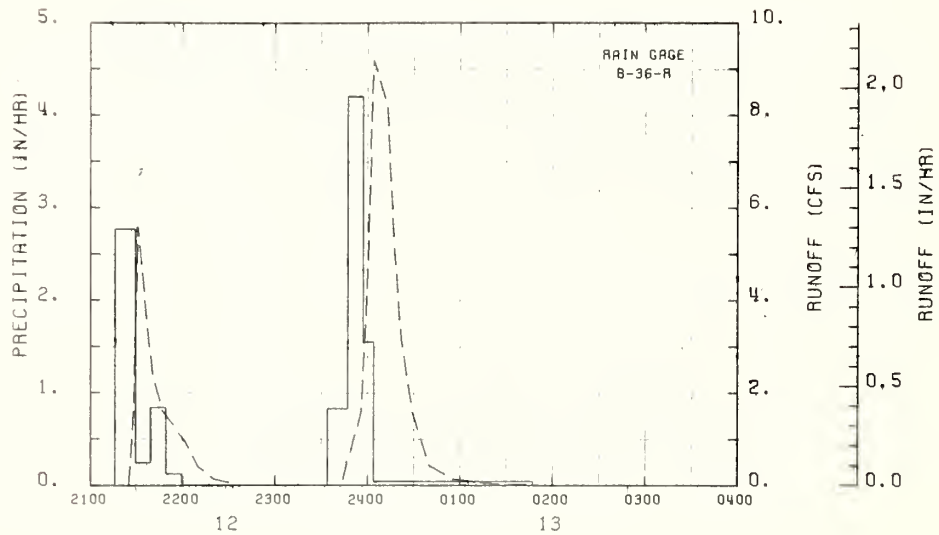
JUNE 21 1964



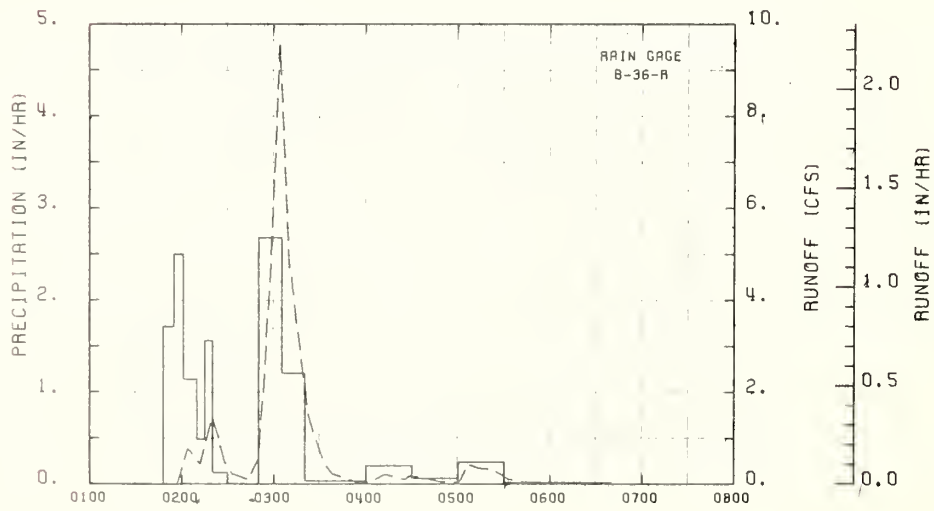
MAY 21 1965

A156

WATERSHED 7H

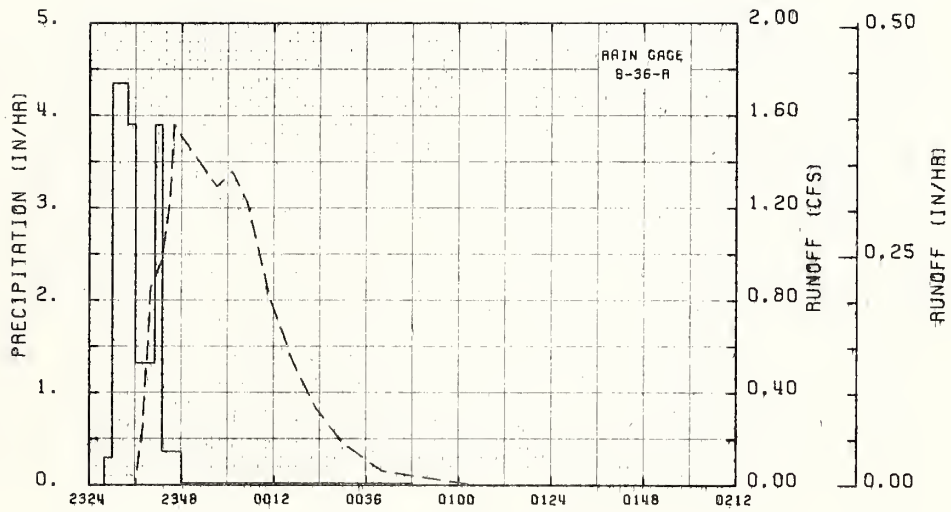


JUNE 12-13 1965

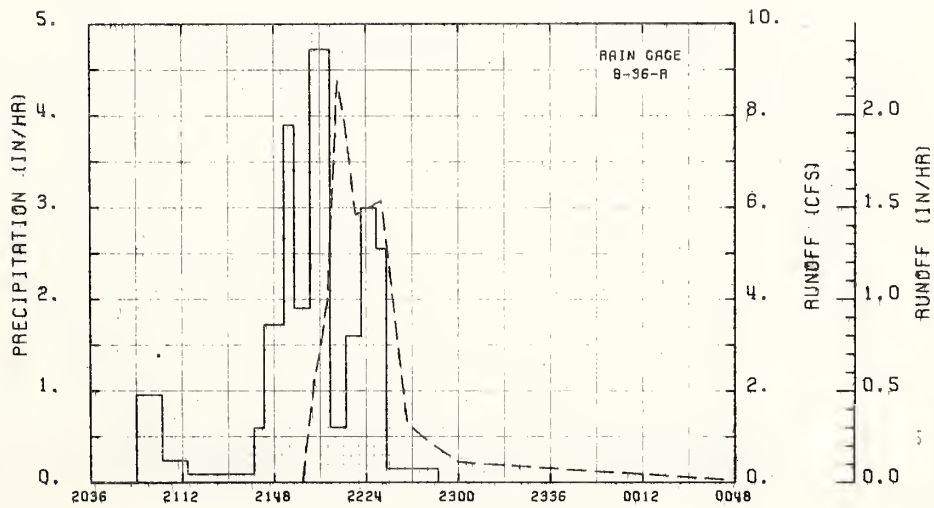


JULY 8 1967

WATERSHED 8H



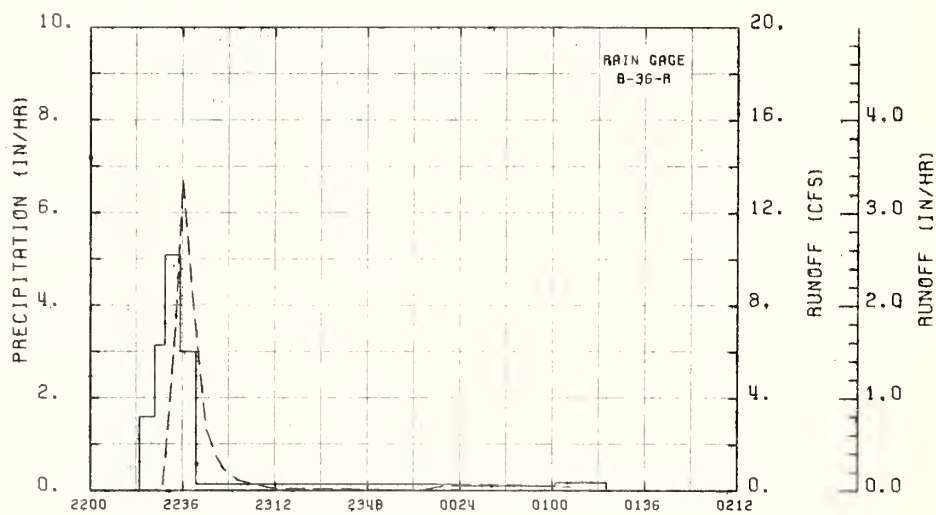
JULY 18 1958



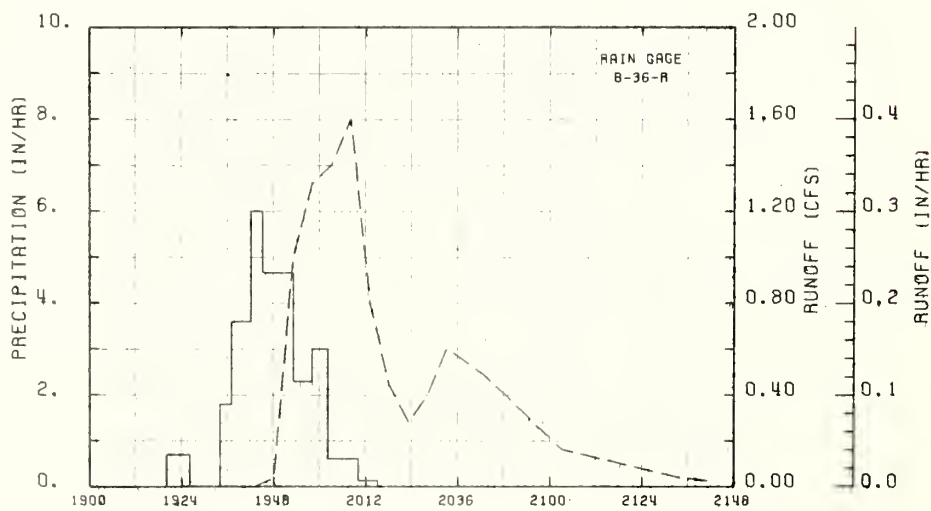
MAY 15 1960

A158

WATERSHED 8H



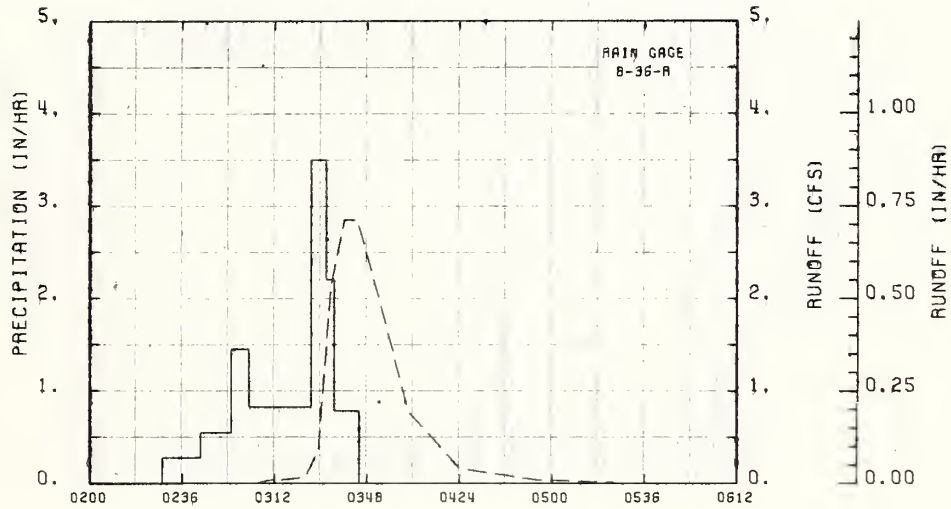
SEPTEMBER 28 1960



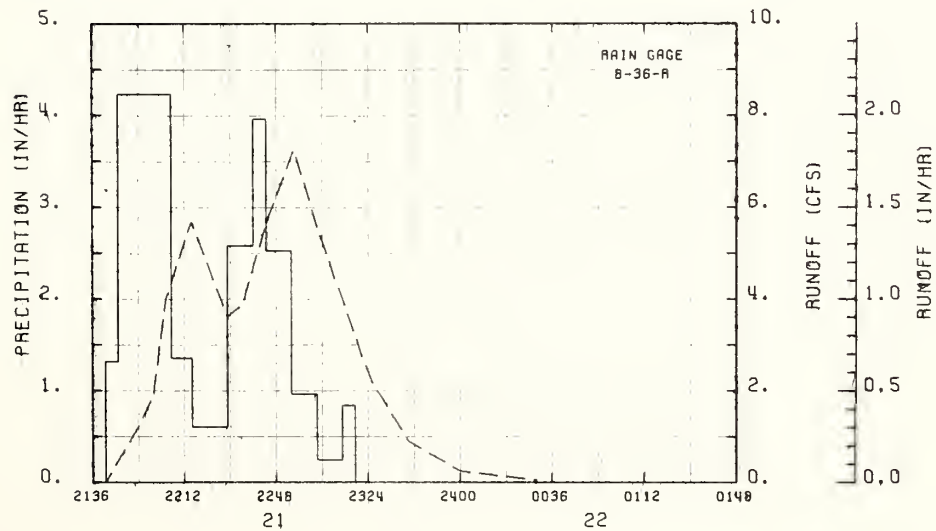
AUGUST 23 1962

A159

WATERSHED 8H



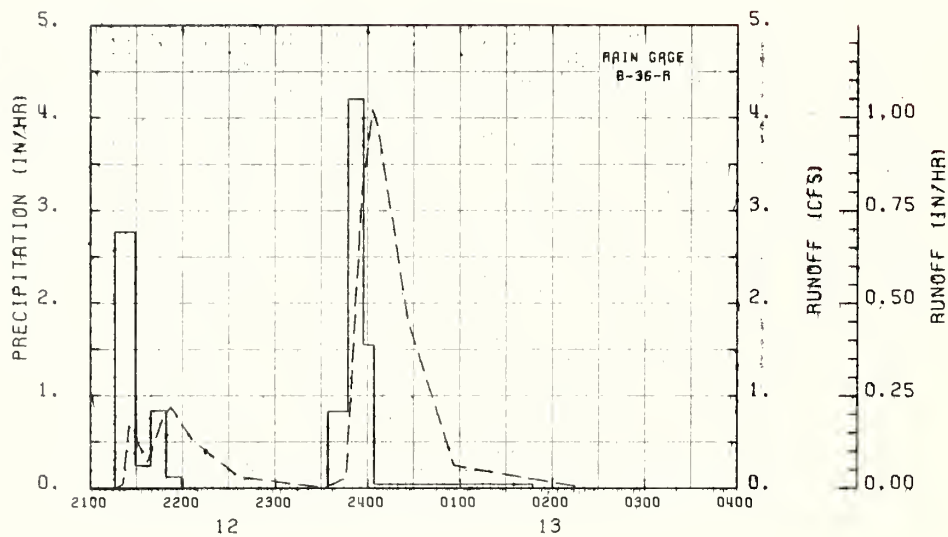
JULY 27 1964



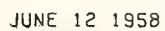
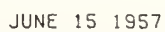
MAY 21-22 1965

AK60

WATERSHED 8H

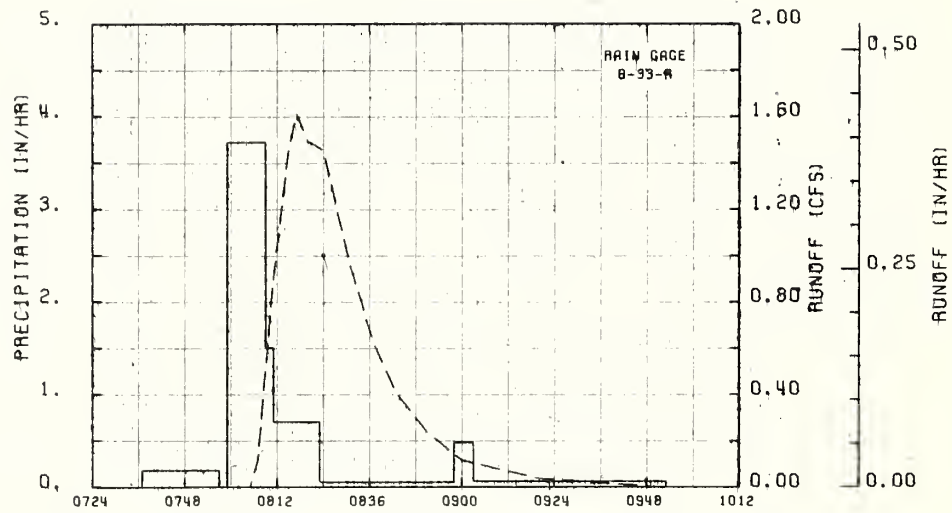


JUNE 12-13 1965

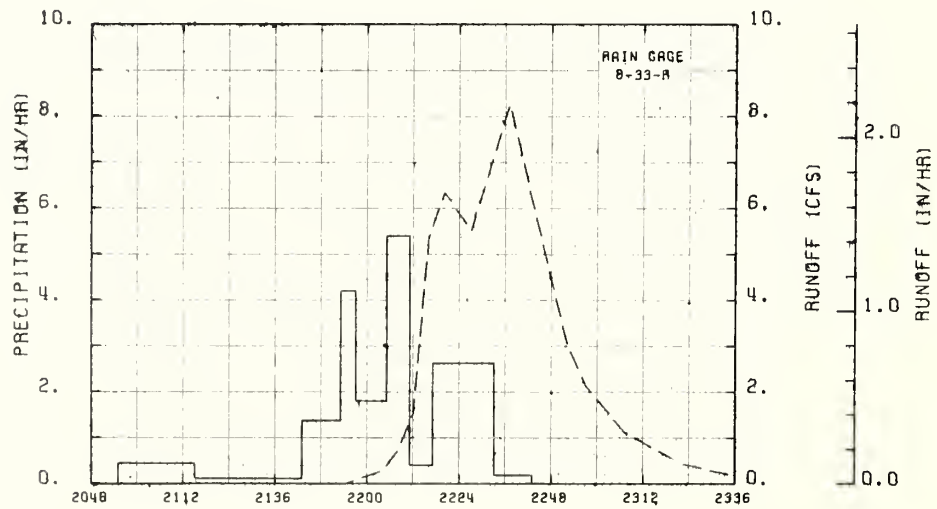


A162

WATERSHED 18 H



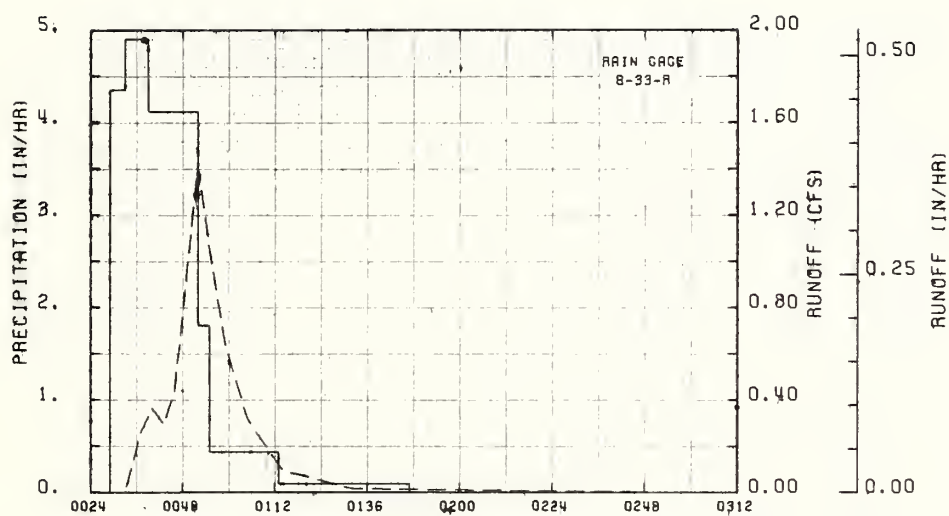
MAY 18 1959



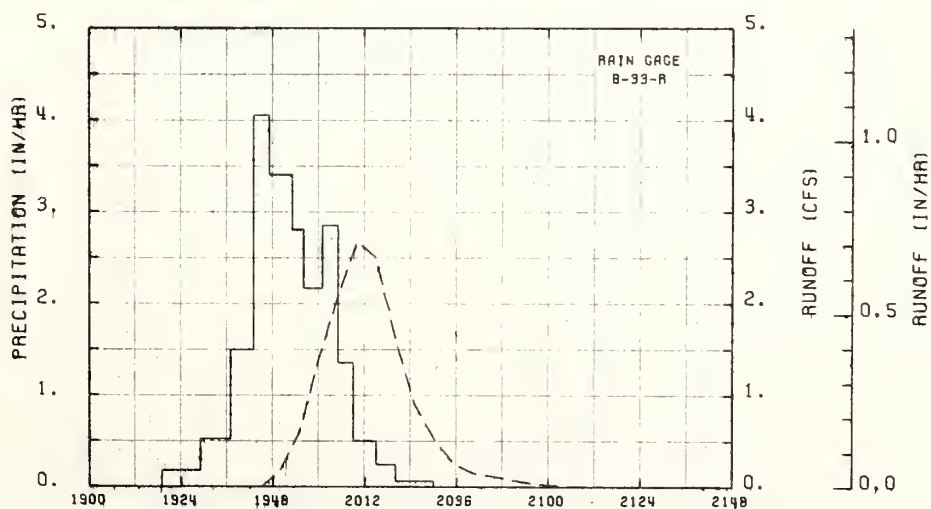
MAY 15 1960

A163

WATERSHED 18 H



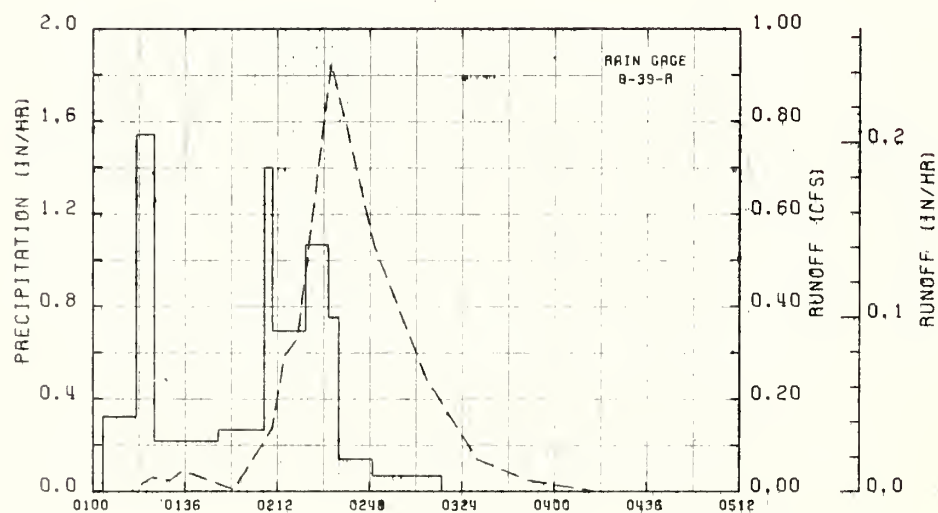
AUGUST 11 1961



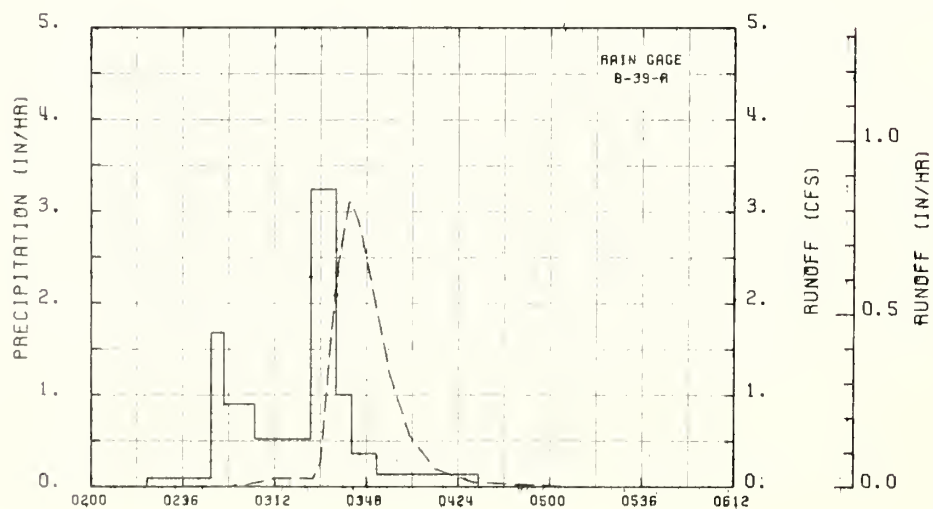
AUGUST 23 1962

A164

WATERSHED 18 H



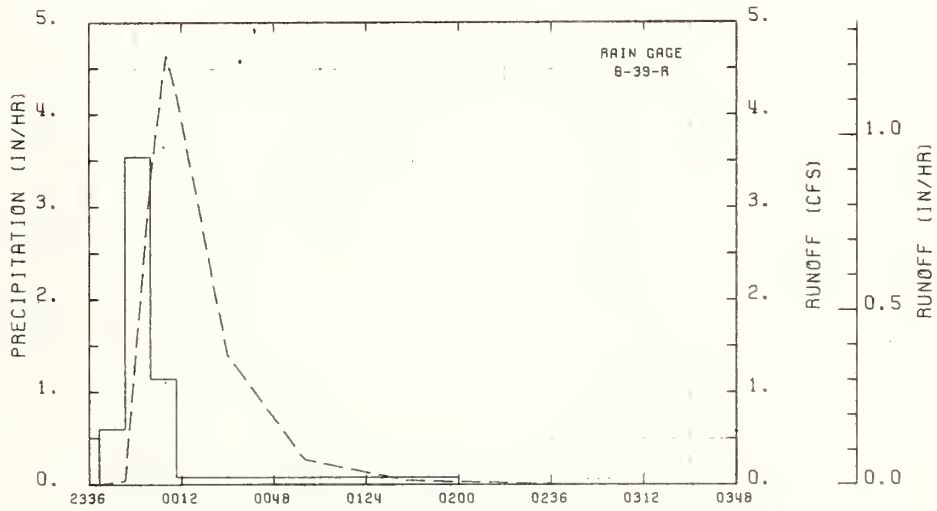
SEPTEMBER 10 1963



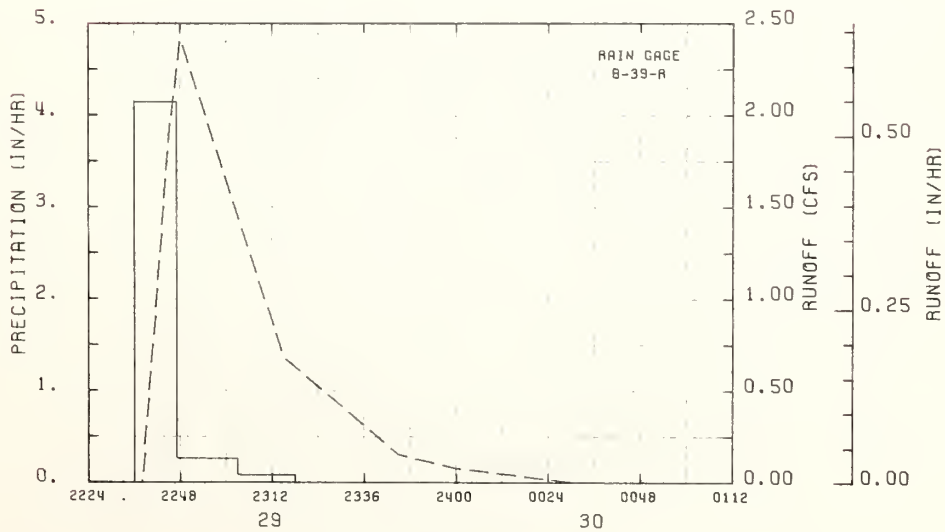
JULY 27 1964

A165

WATERSHED 18 H



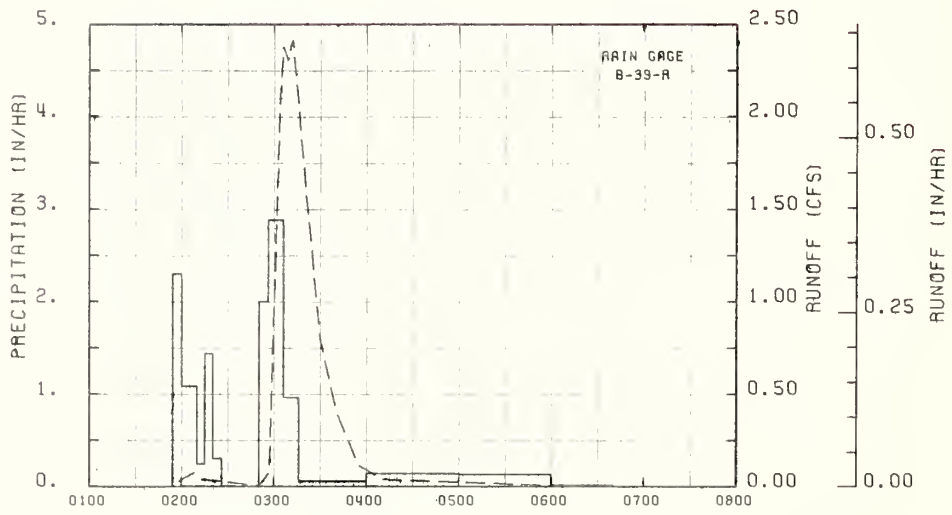
JUNE 12 1965



JUNE 29-30 1965

A166

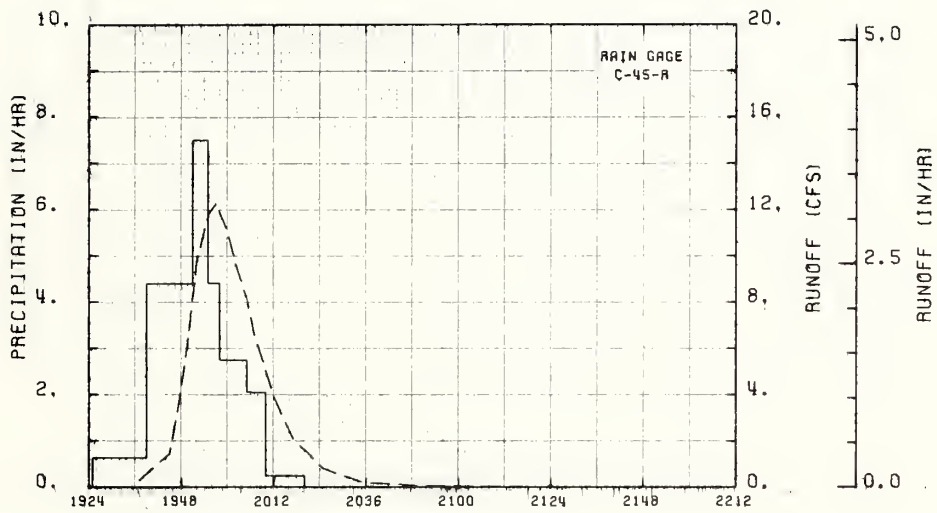
WATERSHED 18 H



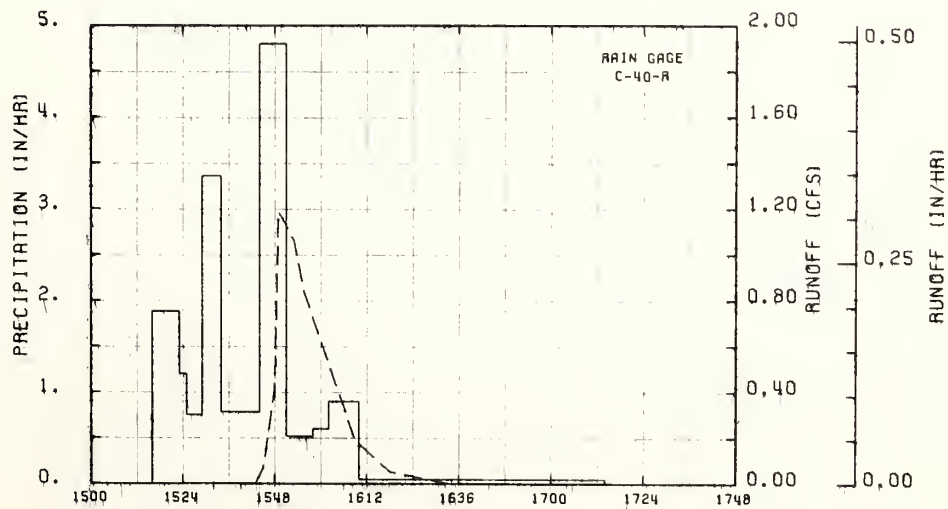
JULY 8 1967

A167

WATERSHED 22 H

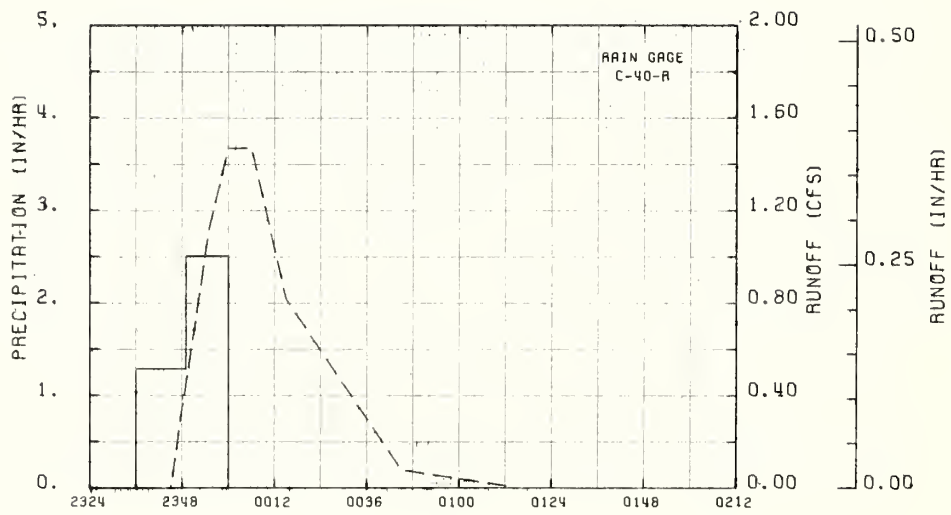


AUGUST 23 1962



SEPTEMBER 9 1963

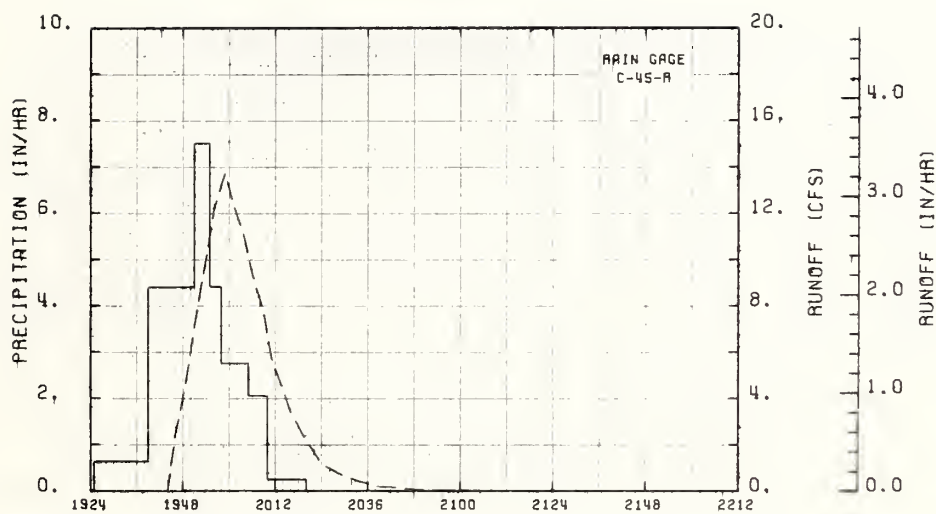
4168
WATERSHED 22 H



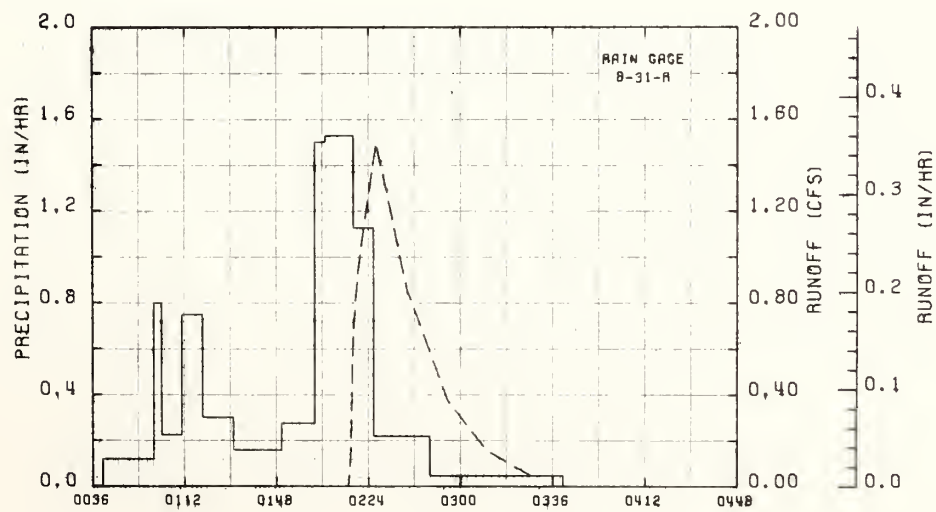
JUNE 12 1965

A169

WATERSHED 23 H



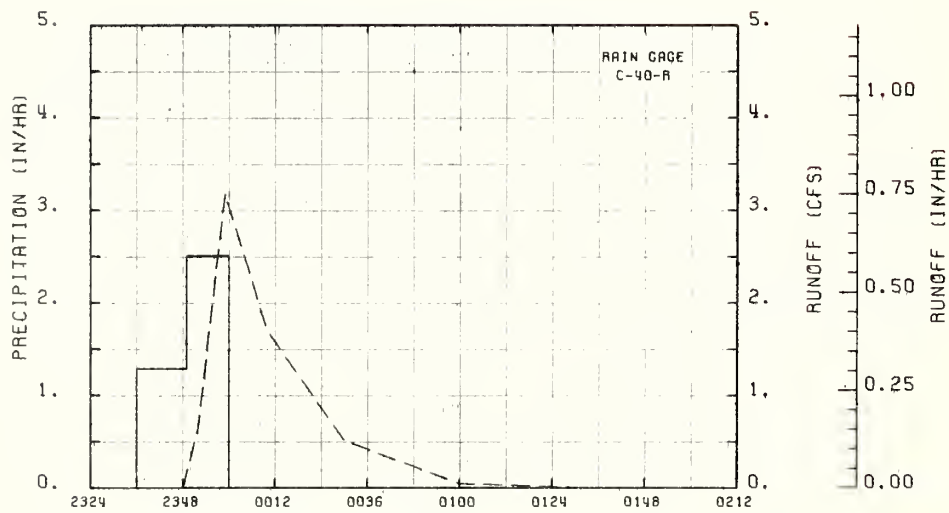
AUGUST 23 1962



SEPTEMBER 10 1963

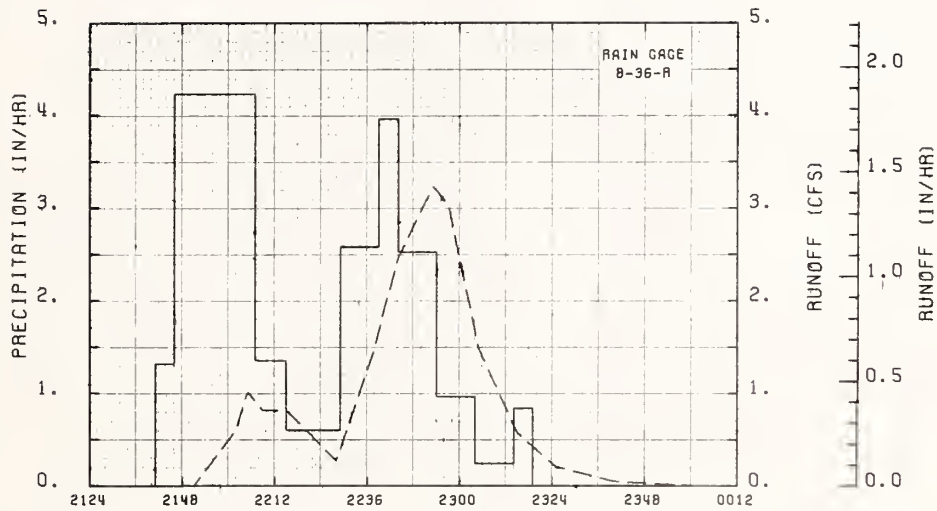
A170

WATERSHED 23 H

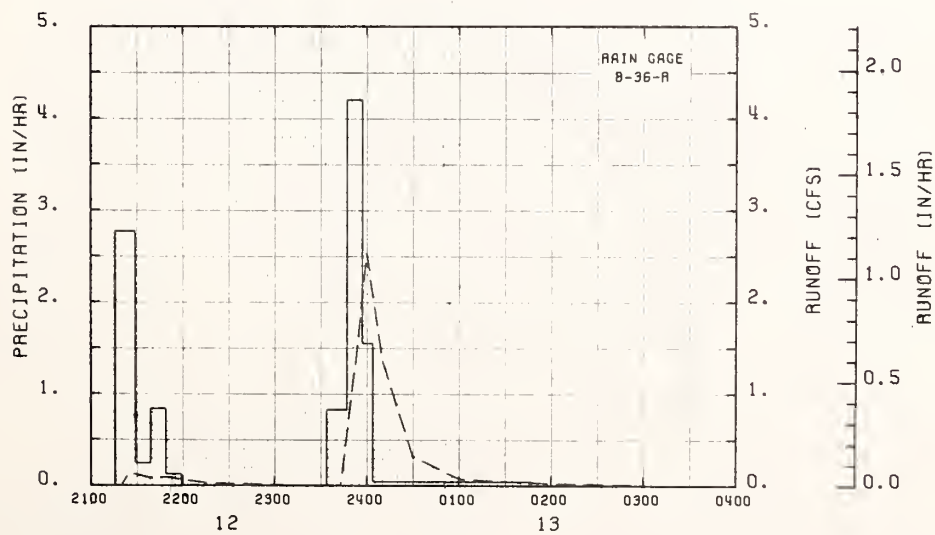


JUNE 12 1965

A171
WATERSHED 25 H



MAY 21 1965



JUNE 12-13 1965

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